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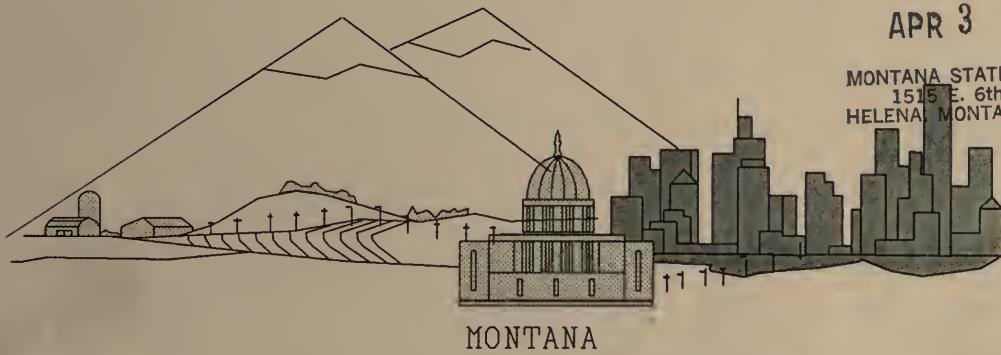
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# INFORMATION AND COMMUNICATION TECHNOLOGY IN MONTANA STATE GOVERNMENT

A Report of Agency Information System Plans  
for Fiscal Years 1990 - 1991

STATE DOCUMENTS COLLECTION

APR 3 1989



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January 1989

Information and Communication Technology in Montana State Government is published every other year by the Department of Administration, Information Services Division, Helena, MT. The Resource Management Unit of the Information Services Division serves as the managing editor for this report.

## FOREWORD

Montana state government has, out of necessity, relied heavily upon its information systems as a basis for meeting governmental mandates. The 1988-89 biennium has been a time of tight budgets and personnel resources; and expanding demand for improved governmental service. As never before, governmental managers have turned to automation of information systems to meet the challenges of their jobs. Employees throughout the state are equipped with low cost computer workstations. With the advent of easy to use software, computers have become crucial to job performance.

The Department of Administration has prepared this report as part of its responsibilities for controlling and coordinating data processing and telecommunications. This report, which is prepared each biennium, is unique in several ways:

1) Never before have so many state employees had access to low cost computing capability as they have today and the achievements they have made in putting technology to use have never been so notable (see section on Agency Accomplishments and Goals);

- 2) Increased importance of communication and cooperation between dissimilar systems has emphasized the need for statewide standards for hardware, software, applications and telecommunications (see section on Information System Architectures).
- 3) The basic framework for managing state information and communications is outlined in the section on Information Services Division.
- 4) The state spent approximately \$22 million, or less than 2% of its budget, on information systems and communications. This is in line with private sector I/S budgets (average of all industry I/S budget = 1.9% of organizational budget) as described in the November 21, 1988 DATAMATION Industry-by-Industry I/S Spending Survey. See section on Facts and Figures for further discussion of the state's investments in information systems.

The Department of Administration would like to thank each agency for its contribution to this report. The accomplishments serve as important benchmarks through which the state can judge its progress in information management. The goals will provide guidance to program managers as we explore automation in the 90's. A special thanks is extended to the management and staff of the Information Services Division for their time and dedication to developing the State of Montana's first blueprint of an Information Systems Architecture -- may it serve as a starting point for long term progress.



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Journal of  
Health Politics,  
Policy and Law  
Volume 35, Number 1  
January 2010  
ISSN: 0361-6878  
e-ISSN: 1465-3571  
10.1215/03616878-2009-012  
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http://jhp.uchicago.edu

## AGENCY ACCOMPLISHMENTS AND GOALS

This chapter is a summary of information system accomplishments for fiscal years 1988-89, and information system goals for fiscal years 1990-91. The goals and accomplishments have been developed by agency personnel. The level of detail contained in this section varies depending upon the information submitted, and the size of an agency's budget for information systems. Larger agencies typically have summarized their accomplishment and goals at a fairly high level so as to cover the wide range of information system related activities. Smaller agencies, or agencies with relatively small budgets for information systems, usually have described their accomplishments and goals in more detail. This generally indicates the importance of even minor improvements to their information processing capabilities.

# ADMINISTRATION

## Accomplishments

**Accounting:** An Online Entry and Edit (OE&E) System was developed to enable agencies to enter most SBAS documents online. Another procedure allows agencies to generate transactions on a personal computer, then enter them directly into the SBAS process. A project to download SBAS data to a personal computer is underway. An online adjustment system was implemented to aid in preparing the State's Financial Report.

**Architecture & Engineering:** Long Range Building Program has been automated so that forms such as project recap reports, final recaps, project status reports, completion reports, supervisory fee billings and construction advances can be completed in a more timely manner. A Claims Log which keeps track of payment to contractors was developed and can generate Form 1099's. The Long Range Building Program book that is published every two years is now on a computer.

**Centralized Services:** The Department's biennium budget was coordinated and prepared using the new Executive Budget System. The reconciliation function of the Investment Division's portfolio of the State's investments was automated.

**Director:** A department-wide study on office automation is nearly complete. All administrators with the exception of State Tax Appeal Board and Worker's Compensation Court, use the electronic mail system. A fax machine has been installed for document transmission. All divisions within the Department adopted division microcomputer management guidelines based on guidelines set out by ISD.

**General Services:** A work order control system was established that issues and tracks work orders. This provides work order reports to determine problems and keep track of parts on order. A billing system was set up whereby invoices and questions concerning billing are handled more effectively. A program was created to do cost estimates for reconstruction and remodeling projects. The Statewide Lease Report has been

automated so that on a monthly basis all leases are reviewed to make sure state agencies renew them in a timely manner. A library of standard contract language for every type of contract was set up.

**Information Services:** Consolidation of voice and data telecommunications onto the same network and the replacement of analog long distance facilities with digital facilities has improved the quality of communications and reduced costs. The deregulated telecommunications environment supports competitive procurements for equipment and services; an increasing number of vendors now supply and support state of the art switching systems and network links. The state is now positioned properly to take advantage of, and control, new cost effective telecommunication technologies. Implementation of the Statewide 9-1-1 Program is well underway. This program will provide for access by all citizens to emergency services in Montana communities. Eleven 9-1-1 jurisdictions have been approved as a result of this program.

Computer processing rates have been reduced. ISD has handled the explosive growth in information processing with no net increase in FTEs. Completed development work on several major mainframe applications, providing increased efficiency and effectiveness for several state agencies. Provided technical assistance, computing and network capabilities for implementation of the Criminal Justice Information System which serves the entire law enforcement community. Direct access to information stored on the state's central computer system by the public and private businesses was made available through development of secure and easy to use public access procedures.

## ADMINISTRATION Accomplishments

**Personnel:** The sick leave fund was automated. The Benefits Program was reviewed to determine the best use of automation. Surplus Displaywriters have been installed in Classification to increase word processing capability.

**Property & Supply:** The purchasing catalog used by Stores to bid out supplies sold to state agencies has been automated to create bids. An automated phone-order system has been implemented to simultaneously order supplies for an agency over the phone while checking to see if these supplies are in stock or if a reasonable substitute exists. Also, the capability now exists to prepare a quotation on an order placed by any state agency before a bill is generated.

**Public Employees Retirement:** A network of personal computers has replaced the Honeywell Computer System. Information for retirees is online, and up-to-date information is accessible instantly. As the number of benefits offered by PERD increase, the amount of information required by the actuary increases. This division can offer the information now required, such as retirement and death date, number of beneficiaries, age of beneficiary, etc. The system is now capable of checking whether a person is on both the retiree and active list which corrects a past audit violation. A program is in place to separate part-time and seasonal employees so they won't be annualized in error.

**Publications & Graphics:** WordPerfect files are uploaded directly to the mainframe without having to go through ISD. Any changes needing to be made to these files can be made directly by Publications & Graphics. A mainframe link has been established which facilitates typesetting jobs. A fax machine has been installed to receive bids from vendors.

**Purchasing:** The vendor information module has been fully automated. A bid tabulation system has been implemented to figure preferences that pertain to certain bids. The vendor's list for the State of Montana including federal identification numbers will be used by the State Auditor to pay bills.

**Teachers Retirement:** Personal computers and software has been acquired. A program that calculates retirement income for people contemplating retirement has been implemented. Member annual statements have been enhanced to include: balance owing on additional service credits and current beneficiary's name. Buy-back balances are up-to-date. All members' accounts are online to allow up-to-date answers to questions concerning any account.

**Worker's Compensation Court:** A docket program was automated. Receipts are generated automatically as each pleading is entered or issued.

# ADMINISTRATION

## Goals

**Accounting:** Finalize the installation of the Online Entry and Edit of SBAS transactions. Simplify the preparation of the financial report by downloading the current information directly to personal computers.

**Centralized Services:** Serve as a pilot agency for implementation of Online Entry and Edit of SBAS documents. Improve coordination of all automation activities within the Department of Administration. Continue training for all employees to keep up with state-of-the-art data processing.

**Architecture and Engineering:** Automate the development of specifications. Record contracts and set up tickler files to track warranty dates on construction, completion dates and expiration of insurance policies.

**Directors Office:** Improve the functionality of the installed workstations by providing enhanced word processing software, access to department networks and shared printers.

**General Services:** Set up an inventory system to keep track of janitorial and shop supplies for reorder purposes, and a key inventory system to keep track of and control individual access to state buildings. Purchase a Pitney Bowes computer that would figure the overhead cost for processing mail automatically.

**Information Services:** Improve the "ease of use" of the mainframe computer. Improve the security protection of applications. Improve system availability of the mainframe data network. Reduce the labor intensiveness of data center functions, thereby improving service and reducing costs.

Maintain cost effective telecommunication services. Take advantage of appropriate technology for telecommunications to properly position the state for future telecommunication needs. Implement five to seven new 911 systems each fiscal year. Maximize the use of the shared data network. Improve the utilization of the available frequency spectrum.

Maximize the benefits of the state mainframe by providing for the cost effective use of installed hardware and software facilities. Maximize the productivity of data processing staffs by providing central, shared technical software support services. Increase the efficiency and effectiveness of State agency use of data processing by providing a central pool of systems development professionals.

Standardize microcomputer products by providing support, training and purchasing assistance. Maximize the state's return on the investment in microcomputer and network technology by creating and implementing new cost beneficial statewide office application systems. Improve the accessibility of information to the public by promoting direct private computer access to state information. Improve personnel productivity by implementing new automated productivity tools on microcomputers, mainframes and computer networks.

Provide for the coordination of data processing in state government, at central and local levels, to insure compatibility with the state's communication network and information system architectures.

## ADMINISTRATION Goals

**Personnel:** Develop the capability for staff to draft and transfer documents via the State's Electronic Mail System. Develop a billing and enrollment system for the Training Unit. Improve the Benefits Program. Set up a local area network. Set up a system to track incentive awards, deferred compensation withdrawals, insurance plan appeals and pay plan exceptions. Replace Displaywriters. Automate the manual billing log kept by the Accounting Technician.

**Property and Supply:** Develop a program to have purchase orders issued automatically off the bid tabulation sheets. Install additional memory to accommodate increased history on sales analysis due to a 21 percent rise in sales in FY88. Install an electronic cash register system for surplus sales to allow posting of cash sales directly to the system.

**Public Employees Retirement:** Improve the active system to provide better information for actuaries and auditors in areas such as tracing and calculating buybacks and updated information for employees on salaries.

**Publications and Graphics:** Implement an automated job-tracking system. Install a direct interface from the local area network to the typesetter. The capabilities of the fax machine should be increased to include the ability to send purchasing bids to vendors when time is critical. Transfer purchasing specifications electronically to the purchasing agent for revisions.

**Purchasing:** Finalize the term contract module used to bid and track term contracts. Develop the ability for state agencies to have access to the vendor list online. Add additional hardware to local area network to decrease turnaround time on purchase orders processed by Purchasing.

**State Tax Appeal Board:** Additional software and training is needed for word processing and spreadsheets. Finish the migration of database from PDS to PFS to improve efficiency.

**Teachers Retirement:** Enhance the system to allow a retiring member to know the actual amount of his retirement check. Install the capability to transfer account information from the mainframe to a personal computer. Develop a long range planning document that will identify the ideal and technically workable data processing and information systems for retirement management and operations. Research interfaces with the school systems' computers, enabling Teachers Retirement to answer potential retiree's questions.

**Tort Claims:** Implement a centrally accessible system to allow staff to maintain and track loss experience and claims required for actuarial studies. Install access to Westlaw. Improve office automation systems to allow for document drafting by the professionals. Develop a legal tickler system to allow staff to keep track of deadlines for responding to motions, interrogatories, etc., and as a reminder to the attorneys responsible for the response.

**Workers Compensation Court:** Install the necessary automation capability to prepare the Court's budget using the Electronic Budgeting System, and communicate with the statewide electronic mail system and Westlaw. Implement software to use as a tickler system for calendaring pre-trials and trials. Maintain statistical information relating to caseload.

# AGRICULTURE

## Accomplishments

Installed a token ring network system for the entire department. This system provides all employees increased access to their data, sharing of equipment and peripherals, and decreased cost of software. The system supports a network electronic mail system and a network modem for outside communications.

Installed a bulletin board system to provide electronic transfer of data to the agricultural industry. The system provides information such as marketing reports and data, drought information, commodities for sale, and general items of information to the public.

Installed a FAX machine for electronic transfer of documents.

Installed a tape unit for backing up the hard disk on the file servers. The system allows for automatic back ups and file restoration as needed, and provides for increased security of data and department files.

Participated in the Governor's Automation Pilot Project for the electronic transfer of documents and communication between state agencies.

## Goals

Train employees in the use of Wordperfect which has been installed on the new network system.

Enhance the bulletin board system to provide additional access to the system.

Complete a system analysis of the Grain Standards Bureau for automation of the office and their laboratory functions.

## STATE AUDITOR Accomplishments

In addition to general office automation, the State Auditor's Office has been able to automate many Insurance Department functions. General automation, which includes such things as electronic mail, electronic calendars as well as word processing, has been provided to many State Auditor employees.

Systems have been developed for the Insurance Department to automate: Complaint Files, Agent Appointments, Cash Receipting of Taxes and Fees, as well as establishing and maintaining a database of insurance agents and companies licensed to do business in the State.

Investigation Files, Receipting of Fees, and a database of licensed individuals and companies has been automated for the Securities Department.

The State Auditor's in-house computer system has helped to avoid and reduce costs associated with mainframe computer usage. For example, a process to sort warrants on the in-house computer was developed. This process saved approximately \$6,000 in mainframe computer costs.

## Goals

Additional funding is needed to upgrade the State auditor's in-house computer to maintain acceptable levels of response time and performance. The upgrade would include a more powerful CPU, additional disk drives, and additional printers.

The automation of the Insurance and Securities Departments needs to be completed. However, these and other additional systems must be postponed until an upgrade to the computer is accomplished.

An inventory system to keep track of the two-hundred different forms in use would be considered if adequate system capacity were available.

Additionally, an inquiry terminal, to provide the general public with the ability to find out if a specific insurance agent or securities dealer is licensed, would improve service to the public.

# COMMERCE Accomplishments

Expanded the mini-computer to handle increased departmental workload. In addition, another mini was installed as part of a pilot project to be used for exchanging electronic mail with state agencies who use the State's electronic mail system.

The State Lottery installed a mini-computer for keeping track of lottery ticket distribution, prizes and general accounting.

Video Gaming has installed a multi-user microcomputer for processing video gaming licenses and for tracking distribution of revenues to local governments.

## Goals

Increase access to programs and data, balance the workload across systems, and decrease costs of redundant software by improving the departmental system network.

Improve communications with other state governmental agencies by installing the same word processing software (WordPerfect) used by most other state agencies. Improve data transfers between the Commerce system and the central mainframe.

Board of Investments (BOI) is currently installing a multi-user microcomputer to handle its investment functions. In addition, a multiplexor and network hardware were installed to enable BOI to use a mortgage accounting system at Board of Housing.

Montana Promotion Division installed equipment to handle increased inquiries generated through use of the bed tax money for additional advertising. Inmates at the state prison have been trained to process inquiries received through a toll free number.

In the Professional and Occupational Licensing Division: automate the Building Codes function; redesign the licensing boards systems to share databases and programs to eliminate redundancy and promote uniformity of operation; and automate field personnel activities.

The State Lottery plans to purchase and install an online lotto system.

The Video Gaming Control Bureau plans to develop automated systems for some forms of gambling not regulated by the state at this time. This goal is contingent on action by the 1989 legislature.

## FAMILY SERVICES Accomplishments

During the past year, the Department of Family Services installed, in the central office in Helena and Mountain View School, local area networks and placed stand-alone PC's in the five regional offices. These systems allow users access to word processing, electronic spreadsheets and database applications. The central office network provides a gateway to the state mainframe system. Multiple users have the capability to access a large client database (which is shared with SRS), online SBAS, budget inquiry and online personnel update and inquiry (when available).

Thirteen stand-alone PC's are currently being placed in field offices throughout the state as part

a federal grant to the Independent Living program. Telecommunications capability with other DFS offices and commercial bulletin boards is included. These systems will provide youths who are leaving foster care with word processing and special educational programs designed to promote work and day-to-day living skills.

A business computer lab for the Mountain View School is currently on order as part of a federal grant. This lab will allow students to learn keyboarding skill and the use of word processing and electronic spreadsheets.

## Goals

Establish telecommunications with the capability to exchange messages, documents and spreadsheets among DFS central and field offices. Investigate the feasibility of using FAX technology to exchange "paper" documents among DFS central offices and regional offices.

Analyze the current shared client database on the state mainframe system to determine the best option for improvement. Options include splitting the existing database from SRS, rewriting it on the state mainframe or rewriting it on a departmental computer. The existing system is designed primarily as a payment system and provides minimal case management information to the field offices. Any rewrite of the system will need to expand the case management capability and make information immediately accessible to the field.

Develop or purchase PC applications to assist with the following functions: 1) foster care home and placement tracking, 2) Mountain View and Pine Hills inventories, 3) personnel and training, 4) provider audits, 5) provider licensing, 6) adoption referral, 7) resident accounting for

Mountain View and Pine Hills, 8) visitation tracking for aging services, 9) aftercare case management, and 10) electronic mail for central office network.

Increase workstations available on central office network to eliminate shared stations among clerical and accounting support staff. Eventual goal is to have a workstation for each staff member in the central office. Increase field systems by at least one per region for administrative use.

Implement online SBAS at the central office, Mountain View School and Pine Hills School. Implement online payroll at the central office and look into the feasibility of using it at the two institutions.

Improve training opportunities for field and central office staff in the use of existing PC software. Analyze potential benefits and usage by DFS of the system under development by the SRS Teams project.

# Fish Wildlife and Parks Accomplishments

Software was developed to help fish hatcheries plan and monitor the process of converting "food to flesh". The special drawing system was modified to restructure the process for issuing non-resident combination licenses. Some licenses are issued via a drawing and some are first come/first serve. The violators system was redesigned to operate on personal computers, instead of the mainframe, thereby improving retrieval of information, reducing costs, and allowing for distributed processing in the regions. A system to classify land, administered by FWP, was developed to improve retrieval, tracking and reporting capabilities.

Approximately 100 new personal computers and 5 laptop computers were acquired and installed. A Novell network was established in Helena office to improve communications, transfer of data, and fiscal administration. Existing users were trained to use new software and entry level training was provided to approximately 100 new users. A computer aided design system was installed in the Design and Construction Bureau to assist in planning, maintenance and improvement to land managed by FWP.

## Goals

Provide data processing and word processing resources to all department personnel. Improve the timeliness and quality of communications within the department by expanding communications networks to link regions and headquarter staff.

Implement a desktop publishing system to improve the design and reduce the cost of publishing pamphlets, brochures and reports.

Enhance and complete a Geographic Information System (GIS). Insure that geographic data is collected in a form which is compatible with the GIS. Consolidate existing mix of geographic information and systems.

Create and maintain a centralized data repository so that FWP personnel can share commonly used information and avoid the costs of managing multiple information sources.

Decentralize system support by providing training to appropriate region personnel, so that local support is improved and centralized support is focused on planning, procurement, and implementation.

## GOVERNORS OFFICE Accomplishments

**Executive Office.** The Governor is responsible for the appointment of more than 1,000 members of boards and commissions. Formerly, these appointments (term expiration dates, vacancies, and qualifications) were tracked manually. The office designed a data base, utilizing Lotus 1-2-3, to coordinate this information and provide up-to-date reports on board memberships. The office coordinates all major water quality and aquatic resource investigations conducted by all agencies and individuals regarding the Clark Fork River Basin. A draft report was issued for public review and comment.

**Lieutenant Governor.** The Centennial Office has utilized various data base programs on personal computers to manage lists such as the 3,000 member "89'ers" group of interested citizens who want to become involved in Montana's 1989 Centennial. Besides managing a large mailing list, the data base provides statistical information. The Office uses personal computers to track various groups of businesses who are

sanctioned to use the Centennial logo and who must submit quarterly royalty payments to the office. Apple computers are used for desktop publishing and form design.

**Board of Visitors.** The board has utilized personal computers to record and store data regarding the facilities it reviews, statistics regarding the cost of reviews, and patient grievances.

**Office of Budget and Program Planning.** OBPP has developed (in conjunction with ISD) a mainframe/micro computer system for use in the development and submission of agency budget requests. The system provides increased efficiency and additional flexibility in the budget development process for all state agencies. The system is used by the staff of OBPP primarily as a budget analysis tool. It is hoped that the agencies will recognize the value of the system as an ongoing budget monitoring mechanism for use during the legislative session and thereafter.

## Goals

The Governor's Office manages a tremendous volume of correspondence and other office records. Improvements are needed to facilitate filing and retrieval of this data, and to minimize storage space and manual filing. This is an on-going goal. Refinement to the Governor's and Lt. Governor's scheduling systems and appointment records also continues to be a goal.

OBPP plans to utilize the newly created Executive Budgeting System to monitor the budget during the legislative session. The following goals for OBPP information systems, address needs that by definition are on-going. Continue to update and improve the budget development process to keep pace with advancing technology to better serve

state agencies. Develop a streamlined budget submission process. Automate interfaces between the Statewide Budgeting and Accounting System and the Appropriation and Revenue Estimate Systems. Develop emergency and disaster plans for automated systems. Improve automated procedures for magnetic appropriation and revenue estimate data acquisition. Improve automation of fiscal note processing. Continue education of staff in automated technologies.

Office personnel regularly utilize personal computer capability to monitor the operating budget on an on-going basis. One goal is to develop office procedures, using current-level staff and resources, to more fully utilize the capabilities of the personal computer.

## HEALTH Accomplishments

The Department of Health and Environmental Sciences has been continually working toward its goal of department networking. The hardware and software portion is being put in place.

At the same time, the bureaus/programs have been improving their own areas to deal with their workload and increase the proficiency of staff.

All the bureaus/programs have provided computer training for staff members - both support and professional.

Most programs are working with national agencies to share information. Some are electronically transmitting this information. Programs are working together on methods of sharing information via the network.

Purchasing of equipment and software is being monitored and inventoried to maintain standardization.

## Goals

Continue to standardize data processing and information management techniques to state and industry standards. It is the Department's belief that more effective health and environmental management results when information is shared within and between agencies and with the public in a timely and professional manner. The following objectives are necessary if these goals are to be realized.

Increase the central data processing and micro-computer support staff to ensure (1) the support of programs; (2) maintenance of existing programs; (3) consistent software documentation; and (4) implementation of Department goals and objectives.

Utilize the new PC-based computer network to increase the efficiency and productivity of support staff while maintaining and recognizing the specific data management and reporting functions of individual programs and bureaus.

Continue to assist and encourage staff in gaining computer literacy and expertise by providing training; primarily through participation in ISD training programs and, as the need arises, develop training for software which is supported by the Department but for which no training is available through ISD.

## HIGHWAYS Accomplishments

The CADD (Computer Aided Design and Development) system was expanded to include the additional areas of Right-of-Way and Program Development. Right-of-Way is using CADD to determine the alignment of parcels to be acquired for highway construction purposes. Program Development is now using CADD to prepare state and county map layouts.

A new automated road reporting system was developed in order to achieve more timely and consistent road reports.

A desk top publishing system was procured in order to develop professional level documents for distribution outside the Department.

The first stage of a four-year, long range information system plan was approved and accomplished. DEC (Digital Equipment Corporation) Micro VAX hardware, system software, and the Oracle data base management system were chosen to serve as the Department's mid-range departmental platform.

The Department switched Series/1 maintenance vendors after performing an extensive study and RFP process. The new program costs less than half of what the old program did.

A PC based construction progress estimate and change order system was developed. The Missoula District's Project Managers are using the system this construction season to evaluate its usefulness for the entire Department.

The Department's on-line payroll system was upgraded to include "other compensation," including such things as travel advances, per diem, etc. This upgrade was a joint effort between the Department of Highways, the Department of Administration and the State Auditor's Central Payroll Division.

The Department enhanced the Materials Bureau lab results database application by providing automated remote report distribution and other functions.

Phase 1 of the development of an integrated financial management/executive information system is underway. In this phase, the inter-relationships that exist between different project and financial systems will be defined so these systems can be integrated, and management can readily access important information.

## HIGHWAYS Goals

Add CADD capabilities to District offices.

Merge Gravel Pit Inventory System to the Materials Bureau database.

Provide District Offices on-line access to the Maintenance Management System for monitoring and report purposes.

Develop and implement an on-line claims entry and edit procedure for all offices. This system will support the Department's cost accounting requirements as well as those of SBAS.

Complete testing and then implement the PC based construction estimate and change order system in all Districts.

Proceed with stages two and three of the Department's information system plan. Stage two will involve providing one District with DEC Micro VAX hardware and system software, and testing connectivity with Helena headquarters. Stage three will involve bringing the other four Districts into this environment and phasing out the old Series/1 computers. With the completion of phase three, the Department will have a wide area network linking together its PC's, terminals, VAX departmental processors and the Department of Administration's mainframe computer.

Develop a SBAS monitoring and forecasting application on the departmental computer system.

Continue with the development of an integrated financial management/executive information system, utilizing the departmental VAX computers.

## HISTORICAL SOCIETY Accomplishments

The Historical Society has used information technology to interact with the State's accounting system and to help with basic office functions, e.g. word processing. All programs at the Historical Society have added computers to their office environment leading to gains in efficiency, better work flow and increased productivity.

Advances in software, the availability of some grant monies, and changes within the Historical Society have permitted technological changes which support the Society's larger goals of collecting, preserving and presenting Montana history and culture. In particular, the collecting programs (Library, Archives, Photo-Archives, and Museum) have now begun to install or are planning to install automated systems that will allow specific functions of those programs to be performed on computers. The major gains of such systems are in the areas of collection management and manipulation, user access, and efficiencies in those processes that are clerical and routine.

Installation of a Novell Network with file server and six workstations in the Library and one

workstation in Photo-Archives is underway. The system will include library specific software for Serials Control Acquisitions Control, library data base of holdings, On-Line Catalog, and downloading of data from CD-Rom data base, word processing and other selected applications. The ability to buy off-the-shelf software from established vendors should allow the library to rapidly realize the benefits listed above.

Below are listed the Historical Society's information resources by department:

Director: word processing, management functions;  
Business: link to state accounting systems, budgeting;  
Publications: word processing, communications with typesetting facilities;  
Historic Preservation: word processing, statistics, searching of archaeological data base at UofM;  
Library: word processing, acquisition data base, cd-rom data base (LaserCat/WLN), use of State Library's WLN on-line terminal;  
Photo-Archives, Archives, Museum and Education: word processing.

## Goals

Install a system for the Archives to control data entry and searching of archival materials held by the State Archives. Hardware and software needs to be determined during FY89 and installation to follow as soon as possible.

Install additional PC's as work loads in some departments exceed current hardware in place. In particular, an additional PC will be needed for the business office to handle increasing automation of State's accounting system.

Evaluate need for gaining automated control and access to its Museum collections.

Automate functions relating to the collecting, organizing, preserving and presenting to the public, Montana's historical and cultural heritage.

# INSTITUTIONS

## Accomplishments

Implemented a resident care staffing schedule system for Montana Developmental Center to provide a means of electronically generating schedules and recording schedule events. The information contained in the files provide valuable management information and a means of evaluating staffing patterns.

Developed an inmate housing and location application to provide online current information for management of inmates at the Montana State Prison.

## Goals

The Individual Treatment Program (ITP) application will soon be under initial development phases. The ITP program will maintain individual resident records with an evaluation statement. In order for management to make necessary short and long range decisions, a data model will be developed to provide a high level view of the data requirements for the Mental and Residential Services Division.

Improve and expand the Supply Inventory Monitoring System. Bring the department under the online SBAS program. Increase data communication line speeds to handle the increased data volume.

Developed a PC network for the Management Services Division for fiscal management services. Installed an integrated PC/System 38 file server application for the common storage, uploading and downloading of financial, budget and analysis data for the Management Service Division.

Develop applications for the Montana State Hospital from existing data files to assist management in decision processes and tracking patients.

Develop a maintenance and preventative maintenance system for care on equipment on a regular plan of service.

## JUSTICE Accomplishments

During the past year and a half, the Department of Justice has worked to improve the quality, timeliness and usefulness of information required to make sound management decisions.

Extended access to the Driver History system to local driver exam stations. As a result, 98 percent of all driver license renewal information is entered at the local level.

Improved utilization of communication facilities providing local law enforcement agencies access to additional criminal justice information at no additional cost to the state or local governments.

Installed microcomputers so that managers have the ability to develop and store information that does not warrant use of mainframe.

Redesigned and developed a new Motor Vehicle Registration Program. The advantages to this new program, which is scheduled for January 3, 1989 include:

- Substantially increased quality of information since more information will be entered by counties using online screens.
- Improved access to the most recent owner and registration information by law enforcement and others, since updates for owners and registration files will be easier and more timely.
- More timely management information to state and local officials because of improvement to the database file structure. Counties will no longer have to maintain a county vehicle registration file, eliminating dual entry in the 12 largest counties.
- More timely implementation of changes mandated by future legislatures.

## Goals

Provide the Montana Highway Patrol with an interactive automated vehicle accident record system that will supply current accurate accident information for analysis and management action.

Increase the amount of vehicle registration and titling information entered locally from the current level of 48% to about 75%.

Provide six Criminal Justice Information Network users access to the system through intelligent work stations so we can review enhancements to the network provided by the FBI/NCIC.

Train at least two employees in each bureau on the expanded capabilities of microcomputers.

# LABOR Accomplishments

**Job Service:** Installed information systems (such as Hot Line Informers, a public number to receive messages on job availability, training opportunities, etc.) to enable Job Service offices to be more responsive. Facsimile machines are being installed to improve response time and fulfill the needs of employers. These machines, located in each local office, will provide statewide availability of an employer's openings, the same day versus three to four days with the present system.

Database downloading to personal computers is being accomplished. This will provide planning data and performance reports more accurately and with less manhours.

**Unemployment Insurance:** Installed personal computers that communicate to the main computer. This provides staff with flexible work stations and access to the division and local accounting systems, statewide communications network, and word processing. Electronic fund transfers and communications to a national locating system have also been provided.

Made major improvements to the tax and benefit accounting systems. These include: electronic interstate claim functions; improved bank reconciliation; additional disaster recovery procedures; useful management information reports; streamlined transaction capabilities; broadened use of system generated correspondence and liens; crossmatching with other agency systems; overpayment control report delinquency and accounts receivable control improvements; expansion of employer account history; and streamlined employer reporting on magnetic media.

**Centralized Services:** Introduced new technologies in the form of networking, laser printing, and desktop publishing. Initiated a coordinated approach to ensure information systems planning complements department business planning. Developed policies and standards on the acquisition and use of automated tools. Developed a database to track education provided to employ-

ees. Between January 1988 and June 1988, 283 people completed computer training classes. Most of the training was conducted in the departmental computer facility. Developed a process to download SBAS data to PCs to facilitate the analysis of departmental spending patterns.

**Employment Policy:** Automated the Project Work Program and made changes to the JTPA system. A new AFDC program is being installed on a personal computer database. Connected some of the divisions' microcomputers with the Bureau of Labor Statistics (BLS) computer in Washington, D.C. The division also has E-mail capabilities with every state.

**Employment Relations:** Automated many aspects of the division's work. Among the highlights of these accomplishments was the initiating of a LAN (Local Area Network) and the ability of staff to share word processing and database software and to pass documents via the LAN.

**Human Rights:** Completed the automation of a case tracking system. The division has established a database of all cases open on or after July 1, 1986. The division can produce reports regarding the status of case processing. The system is connected to a national database, but all cases are entered locally.

**Workers' Compensation:** Installed major portions of the State Compensation Insurance Funds' Claims Management system. These functions allow for tracking of loss reserves and for automated payment of medical bills. This system reduced payment lags and significantly improved provider information and management controls. Expansion of the minicomputer system doubled user access to word processing and on-line inquiry, improving response time to claimants, providers, and others. Developed a system to manage collection of Payroll Tax and a system to collect minimum premiums from employers whose premium base is below amount needed to cover the Fund's administrative costs.

## LABOR Goals

**Job Service:** Explore methods to replace aging equipment in the present statewide networks. Various options are being discussed and potential replacement computers are being investigated. A pilot replacement project within the next two years is feasible if manufacturers provide code conversion.

Increase the use of personal computers in planning and database management. When databases are in place and where economically feasible, install networks to improve data input and access to data for planning.

Utilize portable personal computers for outreach in outlying towns. Office staff will use the personal computer to dial in to the mainframe and process the applicants's unemployment insurance claim "on the spot".

**Unemployment Insurance:** Continue improvements to the tax and benefit accounting systems in the area of user functionality and overall system flexibility. Investigate the feasibility for a department-wide integrated information system. Upload all SBAS documents from PCs to the central mainframe.

**Centralized Services:** Increase quality and productivity development of new systems and maintenance of older systems by installing Computer Aided Software Engineering (CASE) tools. Install additional networks in work groups and "bridge" these networks together to form a cohesive department network. Investigate the technologies of image storage and retrieval, voice recognition, micro OCR, and 4th and 5th generation languages for potential use. Develop a technology strategy plan that insures all expenditures of funds for automated activity meets the requirements of the information systems plan and the business plan. Upload all SBAS documents to DOA via communications from PCs in the Centralized Services Division. This would include developing systems using Lotus and/or DataEase to generate SBAS documents that can be converted into a format

that is compatible for batch input to SBAS. Upload all payroll data to the State Auditor's Office via communications from PCs in CSD.

**Employment Policy:** Research the possibility of networking the Management Information System with all program operators around the state. The division will continue to implement new techniques to use desktop publishing and quality graphics in its publications.

**Employment Relations:** Bring the balance of individual workstations in the division onto the LAN for enhanced data access and sharing. In addition, plan to bring the Workers' Compensation Mediation Unit (WCMU), the newest administrative unit of the division, onto the LAN as well.

**Human Rights:** Participate in the Commissioner's communication and scheduling project. Acquire additional terminals for the NCR case tracking system. Acquire personal computers for clerical staff (to replace the IBM Displaywriters) and for other professional staff.

**Workers Compensation:** Evaluate the feasibility of installing integrated imaging systems for all major paper-filing systems. These systems will eliminate paper filing and will greatly improve the division's ability to respond to all sections of the private sector as well as save many manhours in filing and retrieving paper. Develop a system to monitor and control rehabilitation and return to work programs.

## LANDS Accomplishments

The Marketing and Trust Revenue business functions of the Trust Land Management System were implemented. The Marketing function allows quick and accurate access to details of all agreements made between the Department and users of trust land. The Trust Revenue function provides automated generation of billings, seeding and production reports, collection and distribution of revenue, and easy access to account status information for users and agreements.

The preliminary analysis and prototyping of the Regulatory Compliance System has been completed. Preliminary analysis for an upgrade to the Forestry Division's Fire Assessment System has begun.

## Goals

Complete the analysis and planning for the Internal Administration and Service/Assistance functions, and implement Regulatory Compliance. Complete the Land Inventory, Evaluation, Development, and Classification subfunctions of the Trust Lands system, assuming availability of funds. Analyze and upgrade the Fire Assessment System.

Install local area networks in Helena and Missoula, and connect the area offices to the State's data communication network.

The Department installed 40 microcomputer systems (for a total of 86) and trained over 100 people (250 people are now trained), further increasing efficiency of word processing, budget planning and analysis, and data management. The Department converted from Displaywrite to Wordperfect, retraining about 200 people in the new word processing program.

Telefax was installed at 8 locations: Helena, Missoula, and the 6 area offices. Token-ring networks were established in Helena and Missoula, and a local area network in Missoula is being installed and tested.

Use microcomputers and telefax to automate purchasing and budgeting processes, manage open cut mining information, gather onsite fire suppression data, and collect data for crop checking, timber cruising, range evaluation, and graphics.

Acquire an automated timber model to assist with timber sale analysis.

Improve management of computer systems by establishing a central budget for maintenance, replacement, and testing of information processing equipment, and for communication services.

## LEGISLATIVE AUDITOR Accomplishments

Installed of a network of sixteen stations, primarily for word processing. Converted the existing word processing function from Displaywriter technology. The installation of additional workstations improved the availability of existing portable microcomputers for use during audits.

Other improvements included expanding the storage and print capacity of the network. These improvements enhanced auditor productivity, improved the quality and efficiency of audit work, and improved the quality of audit reports

## Goals

The Office of the Legislative Auditor's goals include gaining additional experience in auditing information systems of state agencies. In addition, the office plans to determine how to effectively use information systems in accomplishing the overall goals of the office and the legislature.

The Legislative Auditor plans to expand the existing network to include the portable microcomputers equipped with modems and printers,

and eight additional desktop workstations. New microcomputers will continue to be compatible with the state's processing facilities. In addition, the office plans to expand its capabilities on the state's mainframe. The office will connect its network to the state mainframe and download accounting information for use by the audit staff.

# LEGISLATIVE COUNCIL Accomplishments

By using Lotus on PCs and developing a program interface between the Legislative Fiscal Analyst's mainframe budgeting system and the ALTER system, engrossing of the general appropriation bill was accomplished in a matter of hours. As a result, the appropriation bill was heard in committee one day and was ready for second reading on the subsequent day. Using previous methods, at least two full days had been required to engross and print the appropriation bill.

Camera-ready copy for the 1987 legislative rules book was prepared using the ALTER/TIPE system, as opposed to printing on a laser printer. This allowed a much smaller type face to be used. Therefore, the book was much smaller. A small-sized book is important since legislators like to carry this book in their pocket. Also, with the use of camera-ready copy, the print was much easier to read.

Using Ventura Publisher software and a laser printer, several reports and forms were created that have typeset quality and appearance. As an example, The Interim newsletter is now being done with Ventura Publisher. This has added significantly to the readability of the newsletter. Ventura Publisher has also allowed the use of graphics in reports and presentations. The 1989 Code Commissioner bill was prepared on a PC in just one day. Two years ago, it took two weeks to prepare the bill by the previous method.

Several improvements have been made to access code sections from the ALTER code database. A system was developed that runs on the local area network. This system allows a PC user to input a list of code sections to be retrieved from the ALTER code database. The system then passes the request to the mainframe gateway PC which retrieves the code sections and sends them back to the original PC. The system then converts the code sections to Wordperfect format and notifies the user that they are ready to be pulled into Wordperfect. Any workstation on the network can be used to request code sections. All requests

are retrieved by one PC which is connected to the mainframe with an IRMA Board.

With the expanded use of PCs in the Legislative Council, there was a need to have a system that managed the data stored on the PCs. Therefore, an electronic file management system was developed and implemented. This system provides an organized method of: indexing computer-based files for future reference; file deletion; file back-up; file archival; file retrieval from archived status; and monthly reports to help users with their file management and tracking. This system consists of both computer programs and procedures that each user must follow.

Several applications were enhanced or developed using dBase III+ and the network:

**Legislative Information System.** This is a database of information about legislative candidates, legislators, and former legislators. Among the system's features are address labels, rosters, and input for the Interim Directory.

**Interested Persons Systems.** This is a database of names and addresses of individuals interested in receiving the reports put out by the interim committees.

**Legislative Inventory System.** This is a database of all of the equipment, furniture, etc., that the Legislative Council owns. The database can print reports by room number and by the name of the person to whom the item is assigned.

**Personnel Time/Cost Accounting System.** This is a database that uses employee pay and benefit rates combined with biweekly time sheet data to produce various reports by time/cost category, agency employee, etc. Data from this system will help management set and justify prices charged for various publications as well as monitor the year-to-date status of the current budget and better project personnel costs for future budgets.

## LEGISLATIVE COUNCIL Goals

Convert the current ALTER word processing system to a system called TextDBMS, to ensure continued service and provide a framework for users to access bills and statute text. This is a top priority project since Montana is one of the last few states to convert from ALTER to TextDBMS.

In an effort to incorporate a majority of the office functions into one word processing package, move the engrossing and enrolling of bills from TextDBMS to Wordperfect. The actual text of the bill will remain on TextDBMS. However, the text will be pulled down to the PC for processing and printing, then stored back on TextDBMS. The bills database will remain on TextDBMS in order to allow public access to it through the state network. Using Wordperfect to engross and enroll bills will also provide the capability of using the desktop publishing features of Wordperfect to show (through font changes) which amendments in a bill were done by the House and which were done by the Senate.

Provide the capability through the current PC Local Area Network of sending (and receiving) messages and mail to other staff, other agencies, legislators, and the public. Also provide the capability of keeping an appointment calendar on the PC with an electronic scheduling feature. In addition to hard-bound books, offer for sale the session proceedings, the Montana Code Annotated, and other publications on CD-ROM. Also offer the session proceedings in microfiche form.

Through a bill draft tracking system, improve on the ability to determine the exact stage of a bill during the drafting phase so that this information can be provided to the legislator requesting the

bill. This information can also be used as a management tool. Evaluate the feasibility of providing an on-line amendment creation and tracking system. This system would allow amendments proposed in committees and on the floor to be created and stored as documents on-line and be available for on-line inspection, printout, and transfer.

Evaluate the feasibility of providing group authoring software. This software would have the capability of tracking the comments put into a document as it is passed electronically from author to editor, to other staff, and finally back to the original author for review of comments.

Evaluate the feasibility of providing public access to text of bills. Evaluate the feasibility of implementing an on-line library catalog system. Maintain an adequate training function for data processing and user staff.

Maintain an in-house data processing directional committee whose responsibilities include:

- developing and implementing standards and procedures with regard to security, back-up and disaster recovery, naming conventions, etc.;
- evaluating and planning for hardware and software purchases, implementations, and training; and
- evaluating the feasibility of new data processing projects and prioritizing these projects as necessary.

## STATE LIBRARY Accomplishments

New state publications were cataloged and entered into the Western Library Network database. This function provides the following benefits to Montanans: a) machine-readable catalog records, b) control of and more efficient access to state publications, c) less chance of another institution in the state duplicating the cataloging process, d) access to cataloging records for state publications by libraries throughout the state and region.

The Library has continued to refine and improve utilization of the Western Library Network in Montana (by entering records and encouraging other libraries to enter records into machine-readable format) to build a statewide multi-library database of location records.

The Library has joined the OCLC bibliographic utility to provide for additional resource sharing within the state and within the Eastern region. This will allow the Library to pursue cooperation and communication among the major bibliographic utilities and facilitate the addition of holdings of Montana libraries to the statewide database on an ongoing basis.

The Information Resources Unit has taken advantage of demonstration offers, from such companies as Information Access California, to learn and discover new technologies and options for providing quick efficient access to information needed by state employees.

Library Development published an extremely popular and valuable resource, Non-Fiction Collection Guidelines.

The Library participates in the Intermountain Community Learning and Information Services (ICLIS), a four-state project which focuses on education of rural populations through computer and telecommunications technology. ICLIS has served Montanans with a series of database offerings to help in areas so diverse as rural economic development, career guidance, up-to-date medical information, and university course work.

The State Library established links to a national library network, a rural educator's network and a statewide Office of Public Instruction network. These networks serve a variety of purposes including surveying job opportunities for librarians and recent library school graduates in the state, consulting with rural librarians and planning continuing education workshops for librarians in Montana.

The State Library has secured approval from the State Library Commission to hire an automation consultant with federal LSCA funds.

The Montana Library for the Blind and Physically Handicapped (MLBPH) has installed the Reader Enrollment and Delivery System (READS) software package. This system has allowed the MLBPH to implement an inventory control system that tracks materials which users currently have, materials they have had in the past and materials they would like in the future. Additionally the system provides up-to-date information on availability of requested materials.

A microcomputer was installed for the Administrative Unit to use as part the Executive Budget System.

## STATE LIBRARY Accomplishments

The Natural Resource Information System (NRIS) was established to provide a comprehensive system for the acquisition, indexing, and retrieval of important natural resource information statewide. This system is intended to avoid increasing costs of natural resource data gathering by improving management of existing data. NRIS has made considerable progress in developing four main components:

**The Montana Natural Heritage Program** - a thorough inventory of significant elements of the state's biological features that are exemplary, rare, or endangered at the state, national or global level. These elements include plant and animal species, plant communities, aquatic systems, critical habitats and other ecological features of significance.

**The Montana Water Information System** - an access point to important water-related data bases. This system is designed to serve as a clearinghouse for all water data sources and users.

**The Montana Geographic Information System (GIS)** - provides support services to the Department Health pertaining to the EPA Superfund Program and four sites on the Upper Clark Fork. The system was acquired and installed in 1988, with all components operational.

**The Montana Natural Resource Index (MNRI)** - a subject area and geographic area based indexing system of published and unpublished documents, maps, and environmental impact statements and assessments, bibliographies, research reports, etc., and aerial imagery, automated and digital files.

# STATE LIBRARY Goals

Provide more reliable access to current Montana State agency publications, for users within state government and throughout the state. Facilitate access to government information and increase the access points to state agency publications.

These goals will be accomplished by: a) maintaining current cataloging status for all new state publications received by the State Library, b) increasing FTE in state publication program so that retrospective conversion for older publications is accomplished and so that agency contacts can be made so all new state publications make their way to the State Library's collection(s).

Continue to explore inexpensive but effective ways to provide good information services, and provide users within state government and throughout the state, more reliable access to bibliographic utilities and information.

Maintain active participation in the Western Library Network discussions and gather information and skills if a transition situation becomes necessary.

Continue to build databases to be used by the Intermountain Community Learning and Information Services. Establish networks as effective

alternatives to meetings and also as a resources for all libraries in the state to use to keep current on developments in library issues, employment opportunities and state-of-the-art techniques in Library Science.

Coordinate library automation efforts in the state and assist libraries in decision making about purchasing computer equipment. Conduct state-wide classes in computer technology.

The State Library publishes several tools for libraries in Montana. Among these are the Montana State Library Directory, the State Library News and various informational booklets and pamphlets. Investigate the cost and feasibility of a desktop publishing system and install a system, providing the investigation is positive.

Direct future efforts, of The Library for the Blind and Physically Handicapped, toward improving reliability, adding a workstation, and adding information on locally produced and distributed magazines, book records and machines (record players, cassette players, etc.).

The Montana Geographic Information System plans to service other federal, state and private agencies within the State of Montana.

## LIVESTOCK Accomplishments

**Brands-Enforcement:** The Department of Livestock entered into an agreement with the Montana Beef Council to automate local inspection record keeping. This process collects and reports a \$1.00 per head change of ownership fee for cattle, totalling over \$3 million collected for the past two years. The Department benefited by automating non-change of ownership cattle inspections and horse inspections. This has dramatically improved the information regarding 50,000 cattle and 10,000 horse inspections per year.

An additional four livestock market brand offices were automated, bringing the total of automated offices to eight. This has resulted in, as much as eight hours of savings per week per brand office. Time and personnel savings will be more significant in rerecord years when over 55,000 transactions are processed in a single year. The Local Inspectors System and Dealer Licensing System were converted from outdated IBM Displaywriter technology to PC based systems.

**Diagnostic Laboratory:** A Local Area Network (LAN) was established at the lab that will connect the various diagnostic sections together with the main office. This allows the front office to monitor the status of test samples and handle inquiries. Also each diagnostic section can review

test results from other sections. The Clinical Pathology section's automated data capture, retrieval and reporting system was converted from their affiliation with MSU to the State Department of Livestock. The State of Montana assumed responsibility for the diagnostic section from the Veterinary Research Lab of MSU.

A FAX machine was installed in the milk lab. This improves the turnaround time for test results sent to the regional DHIA lab in Provo, Utah by 3-5 days. This provides a significant benefit to the dairy producer in monitoring and controlling the health and production of his herd.

**Centralized Services:** An automated record keeping system was implemented to improve management of monies received in the mail. With the addition of beef council monies, the volume of transactions and total dollar amount is fairly substantial. Inquires and problem resolution necessitated a detailed record of activity with flexible retrieval capability.

**Meat, Milk and Egg:** Licensing and reporting systems were implemented for: egg dealers and graders; milk producers, plants, distributors, testers and haulers; and for meat packing plants, slaughter houses and meat depots.

## Goals

**Brands-Enforcement:** Automate the remaining brand offices at the livestock markets prior to the 1991 rerecord year. Investigate the cost and feasibility of digitizing the livestock brands prior to the rerecord.

**Animal Health:** Automate the process of issuing import permits for livestock entering the State. Implement a system for capturing information from Montana Health Certificates and accounting for certificate numbers that are issued. Phase out the three remaining IBM Displaywriters and

replace with personal computer based systems.

**Diagnostic Laboratory:** Design and implement systems for LAN workstations in receiving and the front office for FY90. Design and implement systems for LAN workstations in serology and bacteriology for FY91.

**Centralized Services:** Establish a local area network (LAN) within Centralized Services that will allow access to the online SBAS, payroll and budget development systems. Implement miscellaneous budgeting and accounting applications.

## MILITARY AFFAIRS Accomplishments

## Goals

A number of personal computers were installed in the Department of Military Affairs, including management level offices. Encouraged use of personal computers by management personnel to assist in planning, drafting, and filing. Made training available to all personnel that wanted to attend and scheduled some training for entire sections. Standardized software and operating systems so that an individual could move throughout the department and be familiar with the system being used. Established links to the state mainframe.

Determine requirements for and install personal computers in offices that are able to demonstrate need for computing capability. Link offices and individuals together so that communications can be expanded and hard copy requirements are reduced. Analyze shared information requirements and begin working on systems and standards for pooled information resources. Study and expand mainframe usage where appropriate.

## MONTANA ARTS COUNCIL Accomplishments

## Goals

The Montana Arts Council has acquired three additional Macintosh computers and a letter quality printer the Council is now able to prepare the majority of its publications in-house. This equipment was made available by the Western States Arts Federation.

The existing database of organizational granting histories was expanded to include the Cultural and Aesthetic Grants.

The Council has been working with local art organizations, who receive computers from Apple Computers, toward the goal of a statewide computer network.

The Montana Arts Council plans to install a local area network in its office to increase the program staff's access to required data. This network would link the Council's Macintosh and PC workstations.

Expand the "Human Resource" database to help the Council identify individuals who have expertise in various fields for use in advisory positions to the Council and state arts organizations.

Send out notification of state and national grant and fellowship awards to those legislators in the grantee's or awardee's district.

## NATURAL RESOURCES AND CONSERVATION Accomplishments

The Department acquired personal computers (PCs) and set up, using an IBM Token Ring Network and Rbase, a Loan and Grant Monitoring System to enhance the department's ability to monitor loans and grants. The system has been in operation for about a year and is nearing completion.

PC's were acquired to replace aging Apple II microcomputers in the Water Rights field offices. Software has been acquired and applications will be developed to enhance the operation of the field offices. Future plans include evaluating the appropriateness of downloading partial copies of water rights data from the mainframe database for field office reference.

The Oil and Gas division has acquired additional PC's to provide additional mainframe access for Billings, new access for Shelby and support for the Well Injection monitoring program which is under development. These PC's will also be used to increase the word processing capabilities of the Oil and Gas Division.

The Energy Division has acquired additional PC's. These PC's and the acquired software are used for modeling, data analysis, project management, report development, project expenditure tracking, policy analysis, data reduction, workshop demonstrations and GIS analysis.

The Montana Reserved Water Rights Compact Commission acquired a Geographic Information

System to assist in analysis for quantification of water rights for Federal and Indian reserved water rights. This is accomplished using a combination of remote sensing and digitized data.

The Water Resources Division acquired additional PC's and CAD software. This equipment and software is used for water modeling, cost analysis, hydrogeologic analysis, irrigation system design, feasibility analysis, data transfer, budgets, project monitoring, and graphical presentation.

The Conservation Districts Division has acquired a modem for their PC which is used to communicate with the Soil Conservation Service for administrative purposes. They have developed a directory of all Conservation Districts in the state and monitor the loans and grants for which they are responsible.

In addition to developing and implementing the Loan and Grant Monitoring system, DNRC is in the process of replacing their Honeywell departmental computer with a Digital Equipment Corporation VAX cluster. The new system will replace the old system at much lower annual costs and have the capability of providing additional functionality at lower costs.

DNRC continued to maintain and enhance the Oil and Gas Production and Water Rights Records systems which are on-line mainframe data base systems.

## Goals

Complete and enhance the Loan and Grant Monitoring System. Develop the Oil and Gas Underground Injection monitoring system. Enhance and improve electronic mail within the department and to other agencies. Review and evaluate data processing applications and replace, maintain, enhance or eliminate based on the

results of the evaluations. Continue to improve the department's capability to provide the services for which it is responsible. Enhance and improve Water Rights field offices capabilities. Educate DNRC staff on using automation to improve their productivity and job performance.

# OFFICE OF PUBLIC INSTRUCTION

## Accomplishments

The Office of Public Instruction has been moving aggressively to implement an office-wide Local Area Network (LAN). As of October 1988, the 100-plus staff of OPI have 75 microcomputers including two network file servers and a gateway server. About 30 computers are now connected to the LAN at two sites; another 35-40 computers and all three buildings will be incorporated into the network by the end of 1988.

A work group consisting of five federal program accountants are sharing a new accounting system to manage the thousands of federal program grants to school districts. They are able to interact directly with the State Budgeting and Accounting System (SBAS) to generate warrants without intermediate typing of claim documents.

Electronic mail is used for interoffice communication and resources, such as printers, are shared via the network. Software is "metered" to give all persons on the network access to a few copies of expensive programs, within the limitations of the licensing and copyrights. These network services provide the Office of Public Instruction advantages in both effectiveness and efficiency.

An electronic bulletin for teachers, school administrators and other education personnel has been in use during 1988. It services two local phone lines and two additional incoming WATS lines. The WATS lines have a combined average usage of 175 hours per month. The service allows teachers across the state to share among themselves using a personal computer and a telephone modem. Access is not restricted, even for teachers in the most remote areas of Montana.

The Office continues to promote the use of electronic mail, over GOLIATH, as means of communication among teachers, administrators, university faculty, state agency personnel and OPI administrators and specialists. There are nearly 475 users of this system and the number of users is growing each day. The system is showing the strain of heavy usage and frequent crashes. It

will need to be replaced with an E-Mail and Conference system within the next year.

The number of specialists in the Office who have direct access to a microcomputer with telecommunications capabilities has more than doubled over the last year. This represents a great potential for rapid growth in the use of E-Mail and electronic file transfer between the Office and local districts. Training of teachers in the use of computer telecommunications has been carried out during the past two summers by a project led by the Math and Science Specialists.

A multi-site interactive video program was developed and delivered to hundreds of homes and schools last January which featured Montana school's use of educational technology. The program involved studio participants in Bozeman, Great Falls, and Boise ID, linked together by terrestrial microwave with the signal uplinked to a satellite from Boise and received by downlink antennas in over 30 schools in Montana. The signal was also received by satellite in Bozeman and retransmitted to the Bozeman community and by cable to households across the state which receive KUED/KUSM. The participants described how their curriculum was being expanded or enriched by specific applications of technology.

The use of distance learning technology by Montana high schools to increase their offerings in foreign languages, math and AP English now involves all three of the major suppliers of satellite delivered instruction. In addition to the satellite delivery of student instruction to four districts, student enrichment programs are received by over 60 districts. Staff development programs are also delivered by satellite to over 60 districts several times each month by sponsors which include: NASA, the National Diffusion Network, Classroom Earth, and various education associations and organizations.

## OFFICE OF PUBLIC INSTRUCTION Goals

Enrich voice, data and video capabilities over the next two to five years to manage, deliver, and receive information from schools and other public and private agencies. Identify local area networks within the Office and other offices in the Capitol Complex which can be shared whenever possible so as to avoid unnecessary expense and encourage cooperative planning.

Expand usage of electronic mail and telefacsimile networks which connect state agencies with each other and their local and regional entities, i.e., local school districts, county and regional offices. Investigate long term lease arrangements, with private providers combined with state owned equipment and services, which could be a powerful investment in education with both short term and long term benefits.

Develop a plan for origination and transmission of education policy and practice programs out of Helena to a statewide audience. Devise communication techniques which provide for timely

meetings with school board members, teachers, administrators, and citizens and conserve on limited availability of staff and travel funds. Establish equitable delivery systems which insure equal access to quality education to all students and meets the educational promise made in our Constitution. Investigate the requirements for a satellite, microwave or fiber uplink facility located in Helena.

Continue development of office wide local area network. Migrate from a Honeywell minicomputer to networked microcomputers in the next 3-5 years. Provide inservice, training and software support to OPI staff. Provide centralized back-up facilities and hardware support. Develop additional vertical integration with other state agency networks and mainframe computer facilities. Develop microcomputer applications for school district data reporting and other district administrative activities. Enhance the electronic bulletin board system to allow better cost control.

# PUBLIC SERVICE COMMISSION Accomplishments

**The Case Management Program:** An automated Case Management system was proposed during the 1987 Legislature. The Utilities, Transportation and Legal Divisions, working in conjunction with Centralized Services, developed plans for a computerized system of programs, file arrangements and screen designs, utilizing the IBM System/36. Since that time a formal contract was signed with a vendor in June of 1988. The first in a series of screen design and user-input meetings was held in October. Members of each division reviewed the initial program design submitted by the vendor. The Commission is presently in the process of revising and improving this first design phase, and the first set of revisions has been sent to the vendor.

**The Complaints Program:** A computerized program was designed and installed to handle the complaint process, which is an integral part of commission work. A plan has been developed to utilize communication between the System/36 and personal computers so that information and statistics from the computerized complaint files may be organized and graphed in report form. This report process allows for improved communication with the interested public and Commissions in other states, while at the same time providing a valuable source of data and information for management and staff.

**The Executive Budget System:** In accordance with the Office of Budget and Program Planning, the PSC received, processed and transmitted its budget information for the biennium using the Executive Budget System.

**Distributed Office Support System (DISOSS):** In the last few months, the PSC has successfully installed software which communicates with the statewide electronic mail system. Documents may now be sent via a telecommunications line, allowing for a faster and more expedient processing of information. This installation was unique in that it had not been attempted before with a System/36. Through the cooperative effort of a

number of State employees (including the PSC) and IBM, the system was established.

**The Statistical Analysis System (SAS):** The PSC has been working with SAS for approximately three years. It has proven to be an integral part of operations, particularly for the Transportation Division. Recently, an in-house recording and reporting system was developed for the Vehicle Identification Stamp program. Daily sales are recorded and tracked, and reports are produced from this information, which then provides an audit mechanism. In this way agency information may be matched with information coming from the State host computer.

**The Tariff Review Program:** A program is currently being developed to improve the efficiency of Utilities Division personnel by providing summary information on a computer screen rather than having to search tariff books for basic information.

**Personnel Time Log Program:** By January of 1989, a program will be developed for the Utilities Division which will track personnel time utilization, particularly with reference to individual docket research.

**Security/Documentation/Backup/Contingency Planning:** Daily backup of files has been an information systems policy from the beginning. Two more backups copies of all computerized information are stored off-site. Files, libraries and folders are now examined and updated daily for security purposes. Documentation is required for all new programs, whether programming or text.

**Training:** All personnel are trained to use personal computers and/or System/36. This training is monitored, with follow-up training.

## PUBLIC SERVICE COMMISSION Goals

**Centralized Services:** Manage computerization and information systems to provide efficient processing of information for: a) the daily operations of staff and management, and b) the support of an informed, timely and professional decision-making process by the Public Service Commission.

**The Case Management Program:** Complete the case management program by the end of June, 1989. Maintain all case information in the computer and ensure that information may be accessed quickly and in a form which will serve the user's needs.

**Executive Budgeting System:** Maintain efficient and up-to-date communication with the budget office, particularly during a Legislative session.

**Electronic Mail:** Establish communication links with agencies and offices which serve the informational needs of the PSC (e.g. Consumer Council), and share information needed by others.

**The Tariff Review Program:** Develop a process to maintain summary tariff information on the computer and develop a history of tariff regulation.

**Hardware/Software:** In accordance with information processing needs, continually develop and monitor the necessary upgrades and enhancements for both the Systems/36 and personal computers. Make the appropriate acquisitions of hardware and software, where necessary.

**Security/Documentation/Backup/Contingency Planning:** Review all security, documentation and contingency policies, whether personal computer or System/36, for the purposes of updating and documenting these procedures. Set policy guidelines and inform all management and staff.

**Training:** Educate staff and management to utilize the computer systems as data managers, not just word processors. Work in conjunction with the major programs, such as the Case Management Program, to achieve this goal. Continue to monitor the ISD news bulletins for pertinent training sessions for personnel.

# REVENUE Accomplishments

A Revenue Control System to automate the collection, identification, distribution, and reconciliation of revenues was developed and installed. All functions of a Child Support Enforcement System were completed and implemented. An Accommodations Tax System was developed and placed in production to support the collection and distribution of the accommodations tax established by the 1987 Legislature. The Distributor's Management Accounting System (DMAS) was installed to support liquor inventory management for the Liquor Division.

A department-wide Accounts Receivable System was developed and installed. All equipment was installed to support access to the new Withholding and Individual Income Tax Systems. Individual Income Tax System functions were developed and installed to support automated error correction for 1988 returns.

## Goals

Provide the expanded level of maintenance and enhancement support which is required of the many new systems installed in the Department. Provide the necessary support for the Department's personal and minicomputers including local area networks and the supporting software.

Develop and install the next functions supporting the Individual Income Tax System including: Revenue Agent Report (RAR) processing, Selective Audit, Compliance processing, Statistical Analysis

Equipment was procured to support the Computer Assisted Mass Appraisal System (CAMS) in all counties. The system will be implemented statewide by the end of fiscal year 1989.

Equipment was installed and a migration plan placed in progress to move the Department from the congested shared logic word processing system to a personal computer based word processing system. New Natural Gas and Crude Oil Systems were written and implemented to meet the requirements of changed reporting requirements which resulted from the 1987 Legislative session.

for Audit Criteria (SAAC), Control Data functions, and Electronic Filing.

Modify the Motor Fuels Tax System to contain the requirements for participation in the International Fuel Tax Agreement (IFTA). Automate the process of gathering, storing and using Inheritance Tax, Unclaimed Property, and Cigarette License Tax records. Develop and install a Solid Minerals Database for the Natural Resource and Corporation Tax Division.

## SECRETARY OF STATE Accomplishments

Installed a local area network (LAN) to replace outdated Televideo system for in-house word processing, internal accounting, and database management. Specified, bid and selected an in-house, multi-user system for processing records for Uniform Commercial Code Bureau, including a complete software upgrade and public access system. Automated the election process, including election results analysis, production of election canvass, and ballot certification using the in-house LAN. Provided for public availability of canvass data on magnetic media.

The Administrative Rules index and Records of Governor's appointees was placed on the in-house LAN. The manual notaries public records system was converted to electronic storage and retrieval system on in-house LAN. Mainframe access from the LAN was installed for the purposes of electronic retrieval and submission of budget information plus interagency electronic mail transfer.

## Goals

Provide faster and easier access to Corporate filing records and decrease the current space burden of corporate records by developing and installing an automated system of record filing storage and retrieval, to end "paper shuffling" and optimize space utilization in the Corporations Bureau.

Provide faster and easier access to Uniform Commercial Code filing information by installing upgraded UCC system to provide easy reliable, "user friendly" direct on-line access and report generation capability to financial institutions and other interested users.

Continue the automation of elections by consolidating and documenting the elections program into a "user-friendly" system.

Provide a faster and easier access to all areas of the Secretary of State's office by developing an automated system to send and receive hard copy information (FAX type) between the Secretary of State's office and interested parties.

Complete data entry process for the Notaries Public system thereby placing all notary records in an easily manageable database.

## SOCIAL AND REHABILITATION SERVICES Accomplishments

### Goals

Established a FAMIS/TEAMS project to develop a state-of-the-art human services client eligibility system with a planned completion date of July 1, 1991.

Through use of personal computers operating with various word processing and spreadsheet software, the department has automated a substantial number of time consuming manual procedures. This has resulted in the availability of more timely and meaningful management information for cost allocation plan, fraud recovery, auditing, and DDD demographics.

Participated in downloading accounting and budgeting information from the mainframe and used various network applications through the mainframe.

Continued enhancement to Department data base vendor payment and client demographic systems - MIMS, MMIS, and LIEAP systems. Also acquired a WANG computer and associated hardware and software to provide access to Federal rehabilitation program database information.

Complete FAMIS/TEAMS project to provide a state-of-the-art client eligibility system.

Review interfaces with other state agency databases, provide on-line access to State database files for field offices.

Continue enhancements to the shared SRS and Family Services Client Database and other department data systems.

Continue utilization of personal computers.

Increase networking capabilities of department to allow for submission of invoices and payment of vendor invoices, inquiry into various state databases by the medical providers, and issuance of benefits to eligible clients

## SUPREME COURT Accomplishments

### Goals

The Montana Supreme Court appointed in December, 1986 an eleven-member Commission to study the use of appropriate technology in the Montana Judiciary. The Commission was charged with a comprehensive examination of the needs of the Judiciary relating to computers and other technology. The Commission will submit a report on its examination to the Supreme Court in December, 1988.

The report will contain both observations about the current state of automation in the Judiciary, the short-term and long-term needs of the court system, and recommendations for a long-range approach to meet the needs of the Judiciary relating to information management and technological resources.





# INFORMATION SYSTEM ARCHITECTURE

## Introduction

Information is a critical resource for Montana state government. The delivery of public services depend on the availability of a shared, accessible base of information. This information base is increasingly being stored, modified and communicated through computer and telecommunication networks.

The State of Montana has charged the Department of Administration, through the Information Services Division, to develop, operate and coordinate the networks and information processing resources of state agencies. By developing and operating one network and central computer facility, the state can achieve important and significant economies.

By coordinating agency activities in related areas like office systems, facsimile networks, training and other aspects of information management, the state can achieve the benefits of a standard productive environment. Through standardization of information technologies, information can be communicated and processed at the lowest cost, in terms of dollars invested and personnel time.

Centralized information processing continues to serve the needs of many business applications. There also continues to be a number of applications where the clustering of processing activity lends itself to distributed processing. Implementing such systems, however, has not been an easy task -- in large part because of the incompatibilities in database management, communications and applications programming between the central site and the distributed systems in remote locations. It appears that new technologies will afford the opportunity to integrate key systems across the entire spectrum of processor power.

Important issues which affect the productivity and effectiveness of Montana government, face us as we assimilate new technologies. These issues (such as the direct access by citizens to our growing computer based resources) require new decisions and new investments. This doc-

ument presents the key directions to guide planning and operation and assure that our information technologies effectively support Montana citizens.

Coordination of direction is accomplished by three primary means. First, centrally available services (such as the state telecommunications network) are designed to provide reliable communications and computing capabilities. This results in certain defacto standards. Second, term contracts and central supply of products, ease the process of acquiring products which are supported by the State. And lastly, central review and approval of acquisitions and contracts helps to control proliferation of non-supported products.

Control and coordination decisions shall be based upon the State of Montana's Information System Architecture. The architecture shall serve as a general technical goal or design target for future development of the state's information systems. Important guidelines for statewide, department-wide and personal information systems are described by the following hardware, software, telecommunications and application architectures.

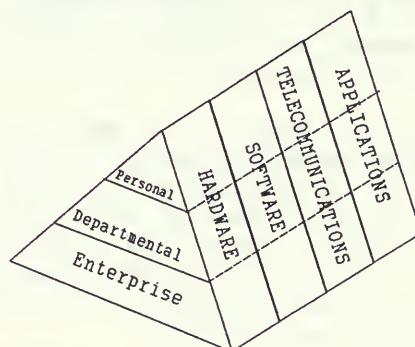


Figure 1 - Montana Information Systems Architecture

# HARDWARE ARCHITECTURES

Hardware Architectures define general guidelines for the acquisition and deployment of computer hardware.

**Central Computer:** Operation of a mainframe based data center enables the State to take advantage of the economies of scale associated with large computer installations. Overhead costs are shared between all users of the central system. The costs and support staffs required to operate a mainframe data center prohibit duplication.

The role of the central data center is to:

- Coordinate data communications between state agencies by functioning as a switch for applications such as micro/mainframe transfers and electronic mail;
- Process large application systems (such as the income tax system) that do not run on smaller computers;
- Process data for applications (such as the payroll and accounting systems) that are shared between agencies;
- Serve as a data repository for information that is critical to the state in terms of availability or security (such as law enforcement information).

The data center includes a large IBM central processor and peripherals which are accessible, locally on the capital complex and from remote locations throughout Montana, via the data network. The data center operates around the clock, seven days a week. Physical and logical security are managed to insure the availability and integrity of state information.

The central data center offers a full range of services normally associated with a large data center including: a) computer processing (batch and online); b) printing; c) data storage and archive; d) special output (COM, microfilm, etc); - and e) network management. The data center and network take advantage of the centrally controlled computing facilities to insure reliable, secure management of information.

Software development and support services for applications which use the central data center or network are provided to state agencies by the Department of Administration. The following types of expertise and service are available: 1) Mainframe Technical Support, 2) Database Applications Support, 3) Application Systems Development, 4) Public Access Service, and 5) Data and Text Entry.

These services will continue to be provided on a full cost recovery basis. Agencies have complete discretion in choosing the type and amount of services which they require. The costs per unit of work will continue to drop as the price/performance ratio of hardware decreases and permits acquisition of more computing capacity at lower costs.

The central data center will continue to operate large scale IBM mainframe computers using the "370" architecture. The most current version of the hardware and operating system may not be installed (for cost/benefits reasons). However, both hardware and software will be maintained at a level that is supported by the vendor and fully compatible with the rest of the industry using the "370" architecture. The capacity of the central processor will be managed to meet the aggregate needs of State agencies for mainframe class computer and data communication services.

## HARDWARE ARCHITECTURES

**Mid-range departmental computers:** Departmental computing has become an invaluable part of the state's computing environment. Mid-range computers provide important economies for agencies which require: automation for unique functions or consolidation/standardization of agency-wide functions. Agencies which operate departmental computers retain complete responsibility for operation, security, disaster recovery, performance, problem determination, and maintenance of hardware and software. Mid-range departmental computers serve the following functions:

- Process applications that are solely agency-wide in nature;
- Serve as a communications switch within a local area of an agency;
- Serve as a switch to communicate with other systems and networks;
- Process and/or serve specialized application requirements (such as computer aided design or lottery transaction processing).

The Department of Administration reviews all plans to acquire departmental processors: to determine if the intended application systems are best installed on departmental processors; and to ensure communications compatibility with the mainframe and state data network.

The mid-range class of computers will experience continued reduction in price and increase in performance, such that more and more applications will be appropriately placed on these types of computers.

These systems will be increasingly linked via local networks to personal workstations and to the mainframe via high speed data communication links. Networking of this sort will provide flexibility for state employees to communicate within their department and beyond to centralized or other agency computing resources.

However, due to the increasing need and complexity of interconnecting heterogeneous systems, a standard for departmental processors needs to be established so that the state may connect systems in an integrated and complementary way. Through standardization, diverse systems can be brought together and accessed from a single terminal anywhere within the state government. Standardization need not necessarily mean one specific processor model, but a set of specifications which meet stringent compatibility and communication requirements (such as peer-to-peer communications).

The benefits of standardization include increased return on the state's investments in departmental computers and greater leverage of programming resources and user experience. Currently, no central support is provided for departmental processors. Central support may evolve if a sufficient base of similar departmental processors is established, and agency requests warrant providing support.

## HARDWARE ARCHITECTURES

**Personal Workstations:** Microcomputers are used throughout state government as the basis for automating management, professional and clerical tasks. The primary advantage of distribution of processing power to individuals is that the user gains substantial performance and response time benefits when accessing subsets of data. A second advantage is in making data available to "user-friendly" applications. Standards for IBM compatible microcomputers are established through selection of products for term contracts. The state selects a variety of microcomputers to meet the needs of the state.

The appropriate role of the personal workstation is to:

- Provide state personnel access to mid-range and mainframe computers, applications and data.
- Enhance the productivity of state employees by providing processing for individualized applications, such as spreadsheet calculations, document creation, program development, and graphing.
- Provide enhanced communications to state personnel through electronic mail, information transfers, etc..

Agencies retain complete responsibility for all aspects of their microcomputer installations. On a contract basis, the Department of Administration provides consulting, support, problem solving and training services for term contract microcomputers and supported software.

The Department of Administration reviews and approves all personal workstation purchases to insure compatibility with the state network and the state's information processing plans.

Central support will continue to be provided for IBM compatible type microcomputers (utilizing both the micro-channel and industry standard buses). Workstation enhancements which provide compatibility with advanced network communications will continue to be incorporated into term contract selection decisions.

Agencies should view older microcomputer architectures based upon the IBM XT design (ie. 8088/86 based processors) as a short term investment. Directions indicate that software requirements will necessitate replacing significant numbers of such equipment within two to three years. Agencies should procure workstations with graphics capability, since many personal and enterprise applications use graphical display interfaces to improve the usability of applications and information.

Additional standards will be developed for specialized workstations so that agencies can benefit from consistency in operation, data interchange and an established base of support expertise.

## SOFTWARE ARCHITECTURES

Software architectures define general guidelines for acquisition and deployment of software resources. The discussion of software architectures covers the following software functions on each hardware platform: Operating systems, Application Development Systems, and Office Systems.

The Department of Administration provides technical support services in conjunction with a series of support "levels". Software which receives "full support" (current maintenance level, priority problem resolution support, training, etc.) will continue to expand. Products that do not receive the "full support" designation will be reviewed for removal and discontinuance.

**Operating System Software.** Operating system software provides overall control and management of physical system resources such as memory, disk storage, and printers. It is important to select operating system software to match the specifics of a given hardware configuration. Hardware and operating systems have performance and capacity limits, both upward and downward. New hardware capabilities often necessitate operating system enhancements.

The State of Montana's central mainframe has recently upgraded its operating system and additional upgrades are anticipated in the future. These upgrades enable the state to extend substantial performance and functional benefits to applications which operate on the central mainframe. Applications require less processing resources and cost less to operate.

Operating systems for departmental processors vary throughout state agencies. To date no effort has been made to standardize operating systems for mid-range computers.

The limitations of operating system software are very evident for personal workstations. In recent years, the computing requirements of personal computers have outstripped the MS-DOS operat-

ing system. Decisions regarding personal computer operating systems must be made in the near future to position the state to take advantage of higher function applications and faster processors.

**Applications Development Systems.** Application development approaches and tools enhance people productivity at the expense of computer hardware productivity. This places the State in a better position to control escalating personnel costs and take advantage of decreasing costs of computer hardware.

State agencies are encouraged to use standard development tools and procedures through cost incentives, support structures, and procurement avenues. Agencies which use standard development practices invest less in personnel training since staff can readily move between agencies without significant retraining. The State also benefits by having systems that can readily exchange information.

The Department of Administration researches and selects, for mainframe and personal workstation platforms, application software development tools that can improve the quality and effectiveness of applications. Additional research is required to select development tools for departmental processors and minimize conversion efforts to migrate applications from one hardware platform to another (or multiple hardware platforms).

The state incorporates new approaches into its standard development practices through innovative application development projects. A complete description regarding current plans for providing software support is contained in "ISD's Development Software Architecture."

# SOFTWARE ARCHITECTURES

**Office Systems.** There has been a profound expansion of office automation in state government. As personal computers move into the workplace, the software used to automate office functions, such as word processing, electronic mail, calendaring, spreadsheets, and graphics directly impacts the productivity of state workers. Office systems must be integrated across all three platforms of computer hardware to provide for productive interoffice communication. In addition, the office systems must be consistent throughout state government, regardless of hardware, to minimize retraining employees who transfer to new positions.

Support, training and trouble shooting is provided to all State staff on standard software tools, so agencies can rely on the long term viability of their applications. Volume licenses, stocking and resale of software help to minimize the cost of procurement and reduce start up efforts.

Montana's office systems must be structured to minimize technical training, and support requirements in order to meet the state's demands for increased office productivity. To satisfy these demands, communication across geographical and organizational boundaries must be assured.

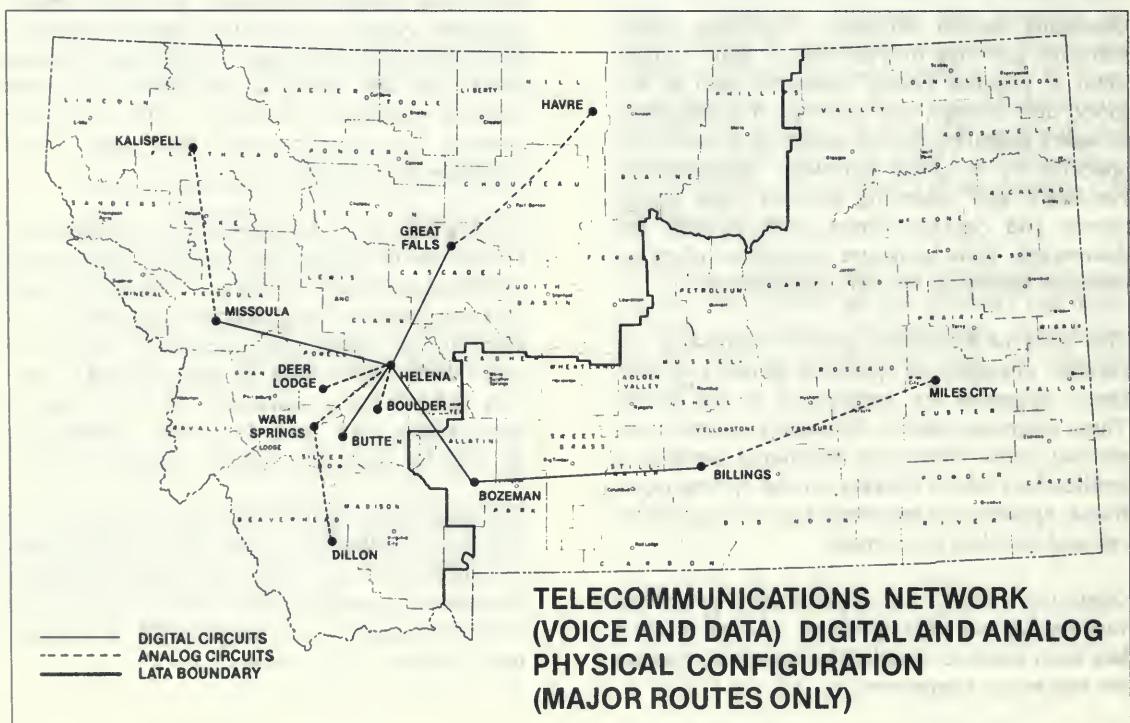


Figure 2 - Statewide Telecommunications Network

# TELECOMMUNICATIONS ARCHITECTURES

Telecommunication Architectures define general principles for linking telephones and computers together within the State of Montana.

The state telecommunication network services four main functions: a) voice communication; b) data communication; c) local area network service; and d) radio communication. Planning, procurement and management services for the shared digital network are provided by the Department of Administration. Voice and data communications links, as well as increasing use of emergency radio links and television communications are centrally coordinated.

**Statewide Telecommunication Network (STN).** The Statewide Telecommunications Network is based upon distributed Northern Telecom switches located in Montana's major cities. Transmission facilities are leased from private providers except for a state owned Helena to Bozeman microwave link. The state benefits from the economies of shared facilities and coordinated network decisions. The role of this network is to:

- Provide voice communications to any site anywhere in the state.
- Provide transmission facilities for data, video, radio, and other communication needs where possible and practical.

The capacity and performance of the communications network will be managed to meet the aggregate needs of State agencies. Unit costs are likely to rise slightly in response to marketplace trends.

**Statewide Data Communication Network (DCN).** The Statewide Data Communication Network, which is based upon IBM's System Network Architecture, is integrated with the voice communication network. Data communication services share the leased transmission lines and microwave facilities of the STN. Bridges and gateways to other networks, as well as access to the public, are coordinated with this network. Duplication of data networks is strictly controlled to avoid the high cost of network management and the potential for incompatibility. The role of the DCN is to:

- Link all agencies and all computer resources in one homogenous network such that information can be freely exchanged (and adequately protected) between agencies and their various computers, regardless of their location in the state.
- Provide maximum benefit of shared transmission facilities to all agencies.

The data communication network will evolve to incorporate emerging standards such as the Open Systems Interconnection model and the Integrated Services Digital Network model. Support for new standards will be keep pace with the introduction of reliable and compatible software products that can be integrated with existing network processes.

# TELECOMMUNICATIONS ARCHITECTURES

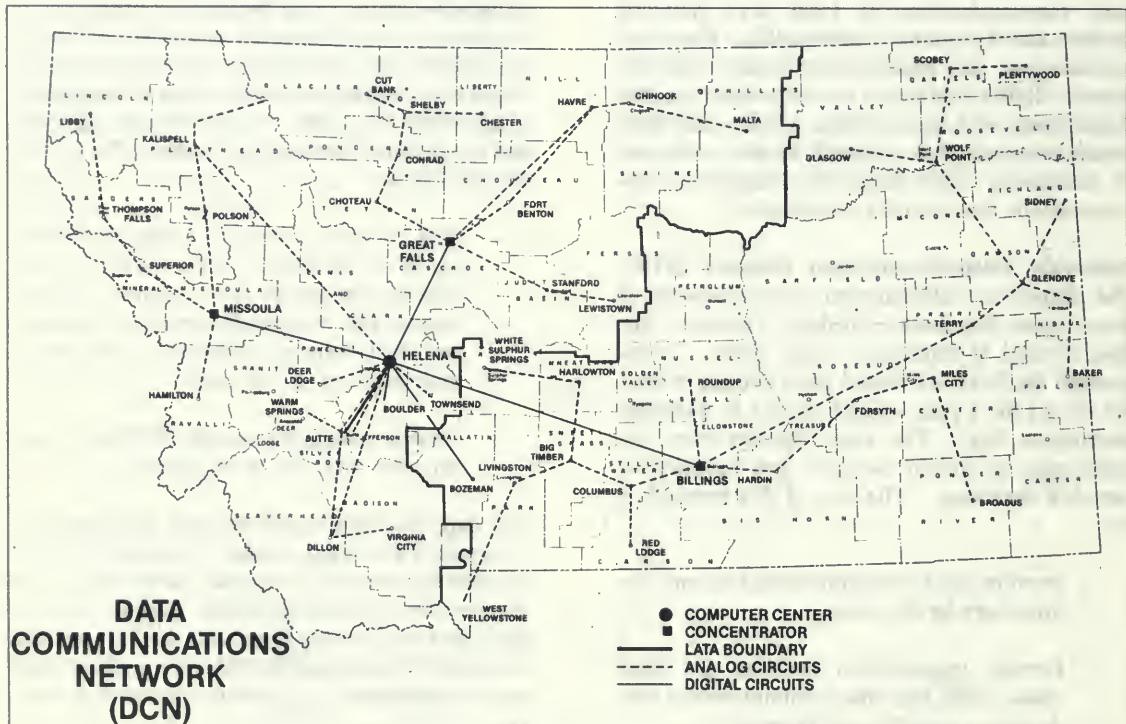


Figure 3 - Data Communications Network

# TELECOMMUNICATIONS ARCHITECTURES

The data network will continue to expand throughout Montana in response to requests for service. Whenever possible, equipment will be installed to meet both current and anticipated needs of the agencies. The data communication network goal is to provide high level connectivity and communication services between state agencies regardless of the hardware and software used by the agencies. Provision and improvement of the hardware and software that enable departmental and personal computers to connect to the central data center network is critical for achievement of this goal.

**Local Area Networks.** Local networks form an integral part of the state data network through gateways that allow computers on these networks to access other state computer facilities. Local Area Networks allow the development of work groups which require frequent access to a common pool of information. The state standard for local area networks is the IEEE standard (802.5) for token ring networks. The function of local area networks is to:

- Connect workstations in a local area for the purpose of sharing hardware, software and information resources.
- Allow workstation users to communicate information quickly and efficiently either within work groups or statewide through gateways to the central data network.

To insure the long term viability of state operated local area networks the Department of Administration configures, installs and maintains all token ring networks as part of its support contracts with agencies. Network hardware and communication configurations are selected through term contracts.

A central network backbone for data communication will be necessary to serve the continuing growth in personal workstations with complex communications requirements.

**Radio Communication Networks.** Mutual aid radio networks for Interagency, Fire Service, National Law Enforcement, and Statewide Law Enforcement provide common radio channel access to all public agencies in Montana. The frequencies and use of these networks are controlled by the Department of Administration.

Access is controlled to insure adequate frequency loading in a specific area and to insure that all Public Safety and Special Emergency agencies have, at their disposal, the full resources available to protect the safety and/or property of the people of Montana.

Coordination of radio communications between state and local systems will continue to be improved through refinement of policies and procedures, assessments of new technologies, review of shared maintenance opportunities, involvement of the Public Safety Communications Task Force, and further integration with the digital voice and data network.

# APPLICATION ARCHITECTURES

Application architectures describe the differences between applications and the decision criteria for determining the appropriate hardware platforms for implementation.

**Enterprise applications.** Software applications designed for the betterment of all state agencies, or to serve business functions common to a group of agencies are considered enterprise applications. Enterprise applications provide the foundation for:

- Control and management of information which is critical to operation of state government.
- Compatibility for central reporting and information exchange.
- Avoidance of duplicative and ongoing development costs in each agency.
- Acquisition of equipment which will facilitate future information exchange.

A key design objective for enterprise applications is the need to share information and provide all users with a consistent view of the application. Traditionally, enterprise applications were located on the central mainframe. The economies of scale of large processors provide significant rationale to locate certain applications on the central mainframe. Other issues such as the single point of control for operations, security and programming have been strong incentives to implement enterprise applications such as the Statewide Budgeting and Accounting System and the Personnel-/Payroll/Position Control system on the mainframe.

As the connectivity of mainframe, departmental and personal workstations improves, enterprise applications may be distributed across multiple hardware platforms. Since each hardware platform is fully capable of storing data, executing programs and interfacing with users, distribution

of enterprise applications provides opportunities to improve the cost, functionality and performance of applications and improve independence and control.

One significant advantage of distributed enterprise applications is the ability to provide common application functions to offices throughout the state without the high cost of telecommunication services. Since communication costs and performance can be a prohibiting factors in servicing state offices, applications and data should be located closest to the user of the application. This implies that when the processing requirements exceed the capabilities of the local processors, communication to a higher level processor should be initiated. This functionality of invoking a remote processor must appear seamless to the user and require little technical knowledge, if the state is to effectively distribute enterprise applications.

To determine the appropriate hardware platform for enterprise applications, agencies and system designers must consider the logistics of distributed data management. Distribution of applications to operational levels can improve the flexibility of agencies, but also adds complexity to the application environments.

The Department of Administration will promote and work with agencies to offer consistent and secure access to state information through centrally managed facilities and standardization of enterprise application development procedures. Functions common to all state offices, such as accounting, payroll, and budget development need flexible systems to minimize state government overhead costs.

It is only the beginning of widespread use of computers by the general public and private business sectors; requests for direct access to state information will undoubtedly increase. Policies and procedures need to be improved to facilitate access to public information.

## APPLICATIONS ARCHITECTURES

**Departmental Applications.** Recent improvement in departmental computing environments have provided opportunities for departments to automate applications which:

- Operate independently of other state programs;
- Share information within a department;
- Need to be compatible with similar functions in other states or federal programs.

Within the past three to five years, the state has migrated many applications from the mainframe to mid-range processors. Networks of workstations, linked to high performance microcomputers, also provide processing for departmental applications.

These applications have demonstrated the importance of local management, where an agency can control application design, development and implementation and respond to changing demands. Local management control needs and uncertainty about future budgetary flexibility have had considerable influence in agency decisions to automate departmental applications using departmental processors.

The "fixed costs" of the departmental processors have allowed agencies to automate other applications which could not directly justify hardware acquisition or central processing costs. However, it is important to note that each departmental application installed, consumes processing capacity and increases demand for future computing capacity.

Changes to agency/programs may necessitate transfers of applications to another agency's processor. As the state expands use of departmental processors without standardization, reorganizations in state government may require costly rewrites to departmental applications.

It is for these reasons that decisions regarding development and placement of departmental applications must be thoroughly analyzed. Consideration must be given to the importance of transportability of applications between personal, departmental and mainframe computers. The state's programming resources ought to be directed to developing new systems instead of redesigning old systems which have: outgrown their hardware capacity, or been transferred to a new organizational structure.

An evaluation is underway to determine the feasibility of developing applications which can operate on any size computer system. This would reduce the dependency on specialized software limited to a single type of computer. This capability is necessary to make departmental applications independent of hardware platform and provide the ability to transfer applications to the hardware of choice.

## APPLICATIONS ARCHITECTURES

**Personal Applications.** Personal workstations and software have provided state employees with productivity tools to absorb the increasing responsibilities of their positions. Personal applications have helped the state to meet and improve services and are appropriate to:

- Address the unique information requirements of a specific position;
- Consolidate information from departmental and enterprise systems to meet adhoc requirements;
- Research new functions and review alternative automation approaches.

Improvements in software systems have begun to deliver upon the promise of end user computing. The average state worker can use information, already available in state systems,

for the purpose of meeting the daily information requirements of their position. Often they are able to answer their own needs with minimal assistance of information processing professionals. This capability is necessary if the state's I/S professionals are to be effectively deployed on priority projects.

The Department of Administration maintains a staff of support specialists who provide training, support and trouble shooting on a contract basis for personal applications which are developed using standard software.

Agencies are expected to manage personal applications to insure appropriate precautions are exercised to insure continued operation.

## SUMMARY

The State of Montana's Information System Architecture is intended to coordinate and encourage the appropriate and effective use of technology as a tool to deliver the most cost effective government possible. It is the Department of Administration's intention to provide and coordinate the use of information services in a manner which is consistent with legislative direction, agency needs, and marketplace trends. We believe that investment in technology will continue to show an increased payback relative to the investment in personnel, providing technology is well managed.

The Department's primary goals in the next two years are:

- To expand the statewide data communications network by standardizing local area networks, providing cost effective applications on the network and providing public access to the network;

- To integrate the various computer systems in the state into a cohesive network through standards for information, programming, and office systems and by providing more central support;
- Improve decisions and productivity by expanding the use of computers on desktops of executives, managers, professionals, and support staff.

Achievement of these goals will necessitate careful selection and management of information technologies. We expect this section of the information systems plan to be used by state government decision-makers and hope the discussion of the state's information architectures provides them with knowledge to support and improve their information management decisions.



## INFORMATION SERVICES DIVISION

This section describes various services and functions of the Department of Administration's Information Services Division. The purpose of this chapter is to detail the directions of ISD so that legislators, agencies, vendors and other decision-makers are kept abreast with the important activities and issues which are part of the state's central information services program. The program is broken down into the following functional areas: digital telecommunications network, data communications network, video communications, public safety, 9-1-1 emergency telephone systems, central computing, application systems, and control and coordination. The achievements and direction of a function usually cross organizational boundaries.

# DIGITAL TELECOMMUNICATIONS NETWORK

## FY 88-89

Telecommunications services have been significantly improved and made more cost-effective through the implementation of new T1 digital links among Montana cities, as an outcome of the Telecommunications Network Project. T1 is a designation for large capacity channels, capable of carrying 1.544 million bits per second of digital data to support voice, data or video transmission. Design specifications were completed and a procurement issued with consulting support provided by Federal Engineering, Inc.

The Telecommunications Policy Advisory Council (TPAC) has provided important support for network improvements in Montana. The Appendix contains a list of members. Based upon the concurrence of the Council, the Department implemented a Digital Telecommunications Network plan.

Consolidation of voice and data telecommunications onto the same network facilities and replacement of analog long distance facilities with new digital facilities interconnecting Montana's major cities has improved the quality of communications and reduced costs. The recently implemented digital transmission facility will save the state \$5,000,000 over the next ten years.

Contracts were completed with:

- U.S. West for leased digital T1 circuits linking: 1) Billings to Bozeman, 2) Helena to Butte, 3) Helena to Missoula, 4) Helena to Great Falls;
- Centel Business Systems for state owned microwave, carrying digital T1 circuits linking Bozeman to Helena;
- TRI Business Systems for digital termination equipment in the linked cities.

All links were in place and operating by August 1987, carrying both voice and data traffic over the shared channels. Figure 2 is a map of the

State's network. Subsequently, additional traffic has been added to the digital network, including emergency radio circuits between Helena and Missoula and between Helena and Butte.

The Northern Telecom switch in Helena at the State Capitol Complex has been upgraded to support full digital transmission. Digital links have been put in place within Helena, to provide service to the Lottery, the Highway Department, and Fort Harrison.

New equipment has been installed at Fort Harrison which provides improved interconnection with the Military Affairs switch at the Armory, and the Northern Telecom SL-1 switch, formerly at Fort Harrison, has been moved to Kalispell. Now all network nodes are Northern Telecom SL-1 switches.

To better manage these improved network capabilities, a new network management, accounting and billing system has been put in place in Helena -- to operate on the State's IBM mainframe. With the cooperation of the City of Helena, state-owned communications links have been put in place along city streets to improve the cost-effectiveness of links among state offices in the Last Chance Gulch area.

A number of new telephone systems have been installed in State agencies all across Montana. To date, all major telephone systems for state agencies have been replaced with state of the art equipment owned by the state (versus expensive lease arrangements). These improvements have not only brought improved technology to agencies, but have reduced agency costs for equipment. Estimates of saving exceed \$10,000,000 for the entire state, over a ten year period. The state is now positioned to take advantage of and control, new telecommunication technologies.

# DIGITAL TELECOMMUNICATIONS NETWORK

## FY 90-91

With increasing use of the digital network, not only for voice and data services but for video, emergency radio and public broadcast feeds, there is a need to allocate network capacity on a dynamic basis. Dynamic allocation of existing bandwidth would improve the utilization of the available frequency spectrum and reduce the need to procure more digital links. Advanced technology needs to be selected to properly position the state for future voice, data, radio and video telecommunication needs. Digital T-1 services should be employed, where economically feasible.

The Telecommunications Bureau is working with the Universities to upgrade the remote Northern Telecom SL-1 switches to full digital operations. In addition, a project is underway to review the viability of providing network services to dormitory students.

The usage of the audio teleconference bridge in Helena is increasing, and in need of replacement. A procurement is planned to acquire a new digital teleconference bridge, to improve quality and add capability.

State agencies and university system units have expressed interest in Voice Mail. The Northern Telecom switches can be upgraded to support

this digital voice message store and forward capability. This service has considerable potential for improving interactions within and among agencies, and with the public; and could support university registration, among other functions.

Regular meetings with agency telecommunications coordinators provide the basis for understanding agency needs. These meetings help the Department of Administration design and upgrade the network to meet additional requirements. By providing telecommunications education and training, agency personnel learn to use state systems and take advantage of advancing technology.

Since it is critical that the Department of Administration maintain cost effective telecommunications network services, cost recovery mechanisms will continue to be structured to arrive at the lowest possible rates for the services offered. Use of existing state owned facilities will be maximized. Agreements with common carriers will be negotiated to provide economies of scale for the state's network.

# DATA COMMUNICATIONS NETWORK

## FY 88-89

Montana's Data Communications Network (DCN) provides local and long distance data circuits to state, county and city offices throughout the Montana, and to two out-of-state locations. As a result of the Telecommunications Network Project discussed above, data and voice traffic share the circuits.

The DCN is comprised of point-to-point and multipoint private circuits leased from US West and AT&T. The network consists of over 4700 miles of circuits, supporting over 120 offices in 58 cities and three states. This network allows over 1900 workstations and end users to have almost instantaneous access to critical State owned data (see Figure 3).

The DCN is growing in size almost constantly. Initially started with a handful of terminals in the Capitol Complex in 1975, the DCN now serves close to 1900 terminals/drops. In addition to the equipment attached to the leased network, the DCN also provides dial-up data communications capabilities for State agencies and for the public. In 1985 and 1987, the public was granted access to the Legislative Bill Status information.

The large growth in data communication demand is a result of two major items. The first is simply an increase in raw numbers of computer workstations, the second item is the ever increasing need to know. In order to provide more accurate and timely information, more and more people are relying on computers. The DCN provides the

vehicle for gaining access to the computers and their stored information.

During 1987-88, a major data network reconfiguration was completed, making effective use of the T1 circuits put in place. The net result of this was the development of a single statewide large shared data network. Almost all State agencies participate in the use of this network. Access points to the network are provided in 51 counties of Montana. The new shared network was designed to sustain a considerable amount of future growth without another major overhaul. The Telecommunications Bureau has made large strides in integrating voice and data over common circuitry. This type of integration allows the state to share common high speed facilities. The net result of facility sharing is an overall reduction in costs.

A major new area of expansion took off in 1988 Local Area Networks (LAN's). During the last year, ISD assisted with the design and implementation of over 20 Token Ring LAN's. These networks allow the agency users to share micro-computer hardware and software facilities, thus resulting in lower costs and providing higher productivity. The LAN's also act as communication gateways to the State's mainframe computer system and to the computing resources on the Data Communications Network.

## DATA COMMUNICATIONS NETWORK FY 90-91

The major issue still facing the State is the dynamic growth of the network. The biggest challenge is the coordination of the network requirements of large diverse departments such as Justice, Revenue and SRS. Shared communication facilities and equipment are used, wherever possible. The network as it exists today is capable of handling a very large increase in traffic without major reconfigurations.

There are two large data communication projects looming in the near future. One for the Department of Revenue and the other for the Department of Social and Rehabilitation Services. Each of these agencies will be placing computer equipment in every county of the State. These two projects will increase the number of terminals in the network by over 500.

Local Area Networks will also play a major role in the future. In today's environment each LAN is an autonomous entity. In the near future there will be an ever increasing demand to link all the various rings into one large LAN. This will be as big a management challenge as it will be a technical challenge. ISD has already standardized on a network strategy that will make this consolidation as smooth as possible.

It is important for the Montana Data Communication Network to maximize the use of the shared data network and utilize common facilities for network services. When absolutely necessary, other network services may be provided, when multiple agencies require similar protocols. All technological alternatives shall be considered when new networking applications are planned.

## VIDEO COMMUNICATIONS FY 88-89

There is increasing interest and activity relating to video communications, in support of education, meetings, and economic development. A Task Force established in the 1987 Legislature under House Joint Resolution 58, chaired by the Commissioner of Higher Education, has brought together representatives of public and private organizations to work together to improve our telecommunications capabilities -- in support of education and economic development. Increased availability of video links is a major focus of this Task Force, of which the Telecommunications Bureau Chief is a member.

The 1987 Legislature appropriated funds to the University of Montana to provide Masters of Business Administration course opportunities in Billings. The University asked the Telecommunications Bureau to issue the procurement and

manage the contract for the needed link. Through a competitive proposal, SJL/MTN of Billings was selected to provide the Missoula to Billings video transmission, with voice communications from Billings to Missoula provided over the State's digital network.

In November 1988, a C-band satellite receiver dish, which had been in place at the Audiovisual Library of the Office of Public Instruction, was moved to the Mitchell Building. The Telecommunications Bureau agreed to manage the tuning and distribution of educational meetings and other video transmissions to meeting rooms on the Capitol complex.

## FY 90-91

A pilot project has been defined for January and February 1989 to demonstrate and evaluate video transmission over the State's Digital Network. With the cooperation of the University of Montana, Montana State University and US West, termination equipment will be put in place in Bozeman, Helena and Missoula to support use and evaluation of T-1 compressed video for classes, seminars and meetings.

It is anticipated that, with the University system, the Office of Public Instruction, state agencies and others, there will be increasing video communications activity in the coming biennium.

The Department of Administration will work closely with the University System and the Office of Public Instruction and state agencies to ensure all requirements are defined so that video telecommunications systems can be configured and coordinated for the benefit of all state agencies. An engineering design based upon a comprehensive needs assessment and requirements definition will be coordinated. Implementation of video circuits should be considered only when they are proven to be economically feasible. Shared use of systems and circuits will be required to gain economies of scale for the various applications and users.

## PUBLIC SAFETY COMMUNICATIONS FY 88-89

A major effort is underway to improve public safety communications in Montana, and the ability of local and state agencies to ensure the safety of all citizens. The Information Services Division has reallocated a position to the Telecommunications Bureau to address these needs.

The Telecommunications Bureau provides support for the Montana Frequency Advisory Committee (MFAC) of the Associated Public-Safety Communications Officers (APCO). MFAC meets monthly to review coordination requests for public safety radio frequency applications. Members of MFAC are listed in Appendix C.

A computerized data base of frequency utilization is maintained by the Bureau; more than 85 frequency coordination requests were completed during 1987-88 for State and local government radio users.

At their meeting on September 12, 1988, the Telecommunications Policy Advisory Council (TPAC) concurred in Bureau's intention to better focus directions for public safety communications for local and state government. A Public Safety Communications Task Force was established to work with TPAC and the Department. Appendix D lists the members of the Task Force.

A procurement has been issued to retain a consultant to support action toward improved public safety communications.

## FY 90-91

The Public Safety Communications Task Force will be working with the Department of Administration and its consultant during 1989, to: identify capabilities in place, identify needs and focus an action plan. Major priorities include improved mutual aid policies and procedures, and possible use of the Digital Network.

Long and short range plans for land mobile radio technology will be developed by working closely with APCO, the FCC, local and state government

users. As new systems are considered, shared use of the backbone network for radio users will be required.

A priority will be placed upon: improving the turnaround time and the process used for frequency request approvals, so that radio network improvements are expedited; and development of improved procedures for the use of mutual aid frequencies.

## 9-1-1 EMERGENCY TELEPHONE SYSTEMS FY 88-89

The 1985 Montana Legislature under Senate Bill 325, established 9-1-1 as the primary emergency telephone number within Montana and made provision for funding assistance and coordination for its implementation throughout the state. (10-4-101 through 10-4-303 MCA). Effective January 1, 1987 a twenty-five cent fee was imposed on each telephone subscriber's access line(s) to support these activities.

Nine-one-one (9-1-1) is the three-digit telephone number designated for public use throughout the United States for reporting an emergency and requesting emergency assistance. It is intended as a nationwide telephone number giving the public direct access to an emergency answering center.

The Department of Administration is charged with administering the funds collected, assisting local communities with the development of 9-1-1 emergency telephone service in their area, and approving the requisite plans for system implementation.

Since January 1987, the Department of Administration has promulgated rules, policies and procedures and published an extensive handbook to assist local communities with the planning and implementation of 9-1-1 emergency telephone service.

The original fiscal note for Senate Bill 325 anticipated program revenues to be approximately \$1.1 million per year. Due to the state's subsequent population decline and accompanying decrease in the number of telephone subscribers, the actual program revenues (\$1,055,103) the first calendar year of the program were 4.1% less than the fiscal note anticipated. The first eighteen months of the program (January 1987 through July 1988) have produced \$1,581,971. FY 1989 projections indicate the twenty-five cent fee will generate \$1,055,148 to support 9-1-1 program activities.

Nine-one-one program revenues are used to support the allowable costs associated with administering the program, telephone system conversions to provide a 9-1-1 system capability and coin-free emergency calling from pay stations. The per capita share of the fund balance are distributed to local governments having an approved 9-1-1 emergency telephone service plan. Funds allocated to local governments not having an approved plan are held in trust and invested in the State's "Short Term Investment Pool" until a plan is approved.

The 9-1-1 approval process entails submission of preliminary and final plans. The State 9-1-1 Program has received twenty preliminary plans and approved fifteen; received sixteen final plans and approved twelve; and converted nine telephone systems under the auspices of the State Program.

## FY 90-91

The Department of Administration will work closely with local 9-1-1 jurisdictions in developing plans for 9-1-1 systems. The goal is to implement five to seven new 9-1-1 systems each fiscal year.

On a continuing basis, all funds allocated to the 9-1-1 program will be managed to insure proper distribution.

## CENTRAL COMPUTING FY 88-89

ISD has handled the explosive growth in information processing, since the beginning of 1981, which has caused: 1) 271% increase in mainframe computer processing, 2) growth in telecommunications from a handful of terminals to nearly 2000 terminals on the data network today, 3) the addition of several new functions such as database administration, office system support and network control -- with only a 72% increase in Computer Services related budget and no net increase in FTE's.

As of June 30, 1988, computer processing rates have been reduced by 39% since 1981. A job or task that cost \$1.00 in 1981 costs only \$.61 in June 1988. The significance of this rate reduction is that today agencies would need to be budgeted

to spend \$5,375,000 at 1981 rates in order to process the workload that they are budgeted \$3,286,000 to process at 1988 rates. A difference is a savings of more than \$2,000,000 each year. These figures are for processing only (ie, batch, CICS, IDMS and TSO) and do not include an additional rate reduction implemented in July 1988.

In consideration for the critical applications which operate on the central mainframe network and in an effort to improve the security of these applications, the Department of Administration engaged a consultant to perform a risk analysis. The findings of this analysis will provide the basis by which the Department will develop improved security measures.

## FY 90-91

As technological advances are made available to reduce the degree of technical knowledge required to use the host computer, the Department will strive to modify hardware/software to substantially improve "ease of use".

Software to manage data center resources and "automate operations" (much of which is performed manually today) will be investigated to reduce the labor intensity of data center functions, improve service and/or reduce costs. Software to automate job scheduling or manage system storage would provide important productivity benefits. On demand backup/restore of data files would reduce intervention required by computer operations.

To improve the security protection of application systems, ACF2 security controls will be applied to all IDMS and CICS applications. Relocation of the host computer system and network control center to a more suitable and secure facility will be pursued to improve the physical security of the host computer configuration. For additional

security and recoverability, redundancy in configuration will be pursued as a design criteria. This will improve availability of the host computer system and data network and improve preventive maintenance, testing, and tuning.

As demand continues to expand for mainframe services, the Department will investigate requirements for high quality, high speed print capability. High volume tape usage or improved price performance may necessitate modernization of the tape library to the newer cartridge tapes.

To provide acceptable and competitive levels of service on a continuing basis the following objectives for performance have been set: 1) provide 99%+ availability of all services during prime shift on weekdays, 2) provide 95%+ availability of all services during swing shift on weekdays, 3) provide 90%+ availability of all services during third shift, and on weekends and holidays, 4) avoid system/configuration causes for online response times in excess of two seconds for local attach and five seconds for remote users.

## APPLICATION SYSTEMS FY 88-89

ISD has completed development or enhancement work on several major applications, providing increased efficiency and effectiveness for state agencies. Some of these applications directly affect the level and quality of services provided to the public. These applications are:

- Workers' Compensation Comprehensive;
- State Trust Land Management;
- Teachers Retirement;
- Public Employees Retirement;
- Payroll/Personnel/Position Control;
- Corporations Management and Uniform Commercial Code; and
- Online Edit and Entry of SBAS documents.

In addition, ISD provided technical assistance, computing and network capabilities for implementation of the Criminal Justice Information System, which serves the entire law enforcement community in this state, as a joint effort with the Department of Justice.

A comprehensive public access facility was developed to provide direct access to information stored on the state's central computer system by the public and private businesses. Public access applications include: Legislative Bill Status and Information; Uniform Commercial Code and Agriculture Liens; Medicaid and Medicare Insurance Information.

## FY 90-91

Acquisition of additional software, designed to increase the productivity of data processing professionals, will continue to be the basis for maximizing the use of automation and minimizing data processing personnel requirements. Support for database and other related software facilities will be stressed for mainframe based applications.

The productivity of agency data processing staffs relies upon the provision of shared software support services that are available to all. To avoid the costs of duplicating software support services in several agencies, the department must insure that the central staff of software specialists has expertise in all major software development facilities used by data processing professionals.

In order to minimize the costs of supporting agency data processing staffs and obtain the maximum benefit from mainframe services, the department plans to develop and implement a comprehensive support plan for mainframe software. Cost effective training for data processing staffs in systems analysis, programming, and other technical subject areas will be part of this plan.

The department will continue to hire and train Programmer/Analysts for subsequent placement in state agencies to meet the demand for data processing professionals that cannot be met by agency recruiting efforts.

To reduce the costs of retaining permanent data processing employees and/or private consultants, system design and programming services will continue to be available for large development projects that exceed the long term personnel needs of the agency. The central pool of systems development professionals will also serve to increase the efficiency and effectiveness of State agency use of data processing.

Technical consulting, systems development, and systems support will be provided for major department and statewide application systems used by all State agencies, and for select small agency systems.

## CONTROL AND COORDINATION FY 88-89

Control and coordination of information processing in state government has been improved through a variety of programs which provide incentives, direction, and support for pre-selected technological approaches. Through negotiation of term contracts for hardware, development of policies and guidelines for the Montana Operations Manual, coordination of pilot projects, and review of hardware procurements and contracts, the state is positioned to leverage its investments in information processing technology.

Substantial progress has been made in all these areas. Term contracts have been expanded to include items such as laser printers, facsimile equipment, communication software, local area network components and a variety of IBM compatible microcomputers.

The Automated Information Systems section of the Montana Operations Manual has been completely revised to include policies regarding planning, acquisition, security, development and maintenance of information systems.

Review of agency computer acquisitions continues to serve as the basis for insuring the technical and operational viability of procurements. A new inventory system provides agencies with improved ability to control their hardware assets.

Coordination of Data Processing Advisory Council activities has provided an extremely beneficial means to address information processing issues which face all state departments.

A cost recovery analysis by David M Griffith Associates Inc., last biennium, provided the basis for a complete revision of the billing processes, and rates used to bill state agencies for usage of the central mainframe. The new streamlined approach to billing has saved in overhead resources necessary for billing, provides management with information necessary to set directions for computer based services and improves the ability of agencies to control their usage of services.

ISD coordinated two office automation pilot projects (primarily for electronic mail). The first project involved connecting DOA administrators and staff to electronic mail and calendaring systems. The purpose of the project was to expedite the review of documents and streamline communication channels within the department. An extensive study of the benefits and opportunities for electronic information use was completed.

Based on the success of this pilot project, a second pilot project connected the Governor's office to department directors to the same electronic mail and calendaring systems. Concurrently, ISD offered a software exchange and training program to standardize the state on WordPerfect as a word processing program. This enhanced electronic mail and will avoid costly document conversions between state agencies in the future. Over 90% of the state is now standardized on WordPerfect.

ISD coordinated the use of electronic budgeting as a means of enhancing staff productivity at all levels of state government. Electronic preparation and review of budget documents made the budget process more accurate and timely. All state agencies participated. This project was possible since the state has standardized on Lotus 1-2-3 as a spreadsheet software program.

Public access to Medicare/Medicaid eligibility information was provided. In addition, Secretary of State's UCC information and Bill Status information continue to be accessible to publicly owned computers equipped with dial up communications.

ISD extended its support for complementary mainframe/microcomputer research and statistical products. This allows agencies to do research and analysis on either the mainframe or microcomputers (depending upon which is most cost effective) with minimal retraining.

# CONTROL AND COORDINATION

## FY 90-91

The control and coordination of data processing in state government, at central and local levels, is necessary to insure compatibility with the state's communication network and the state's information system architectures. Incentives for agencies to select standard hardware and software which is consistent with the state's information system architecture is critical to the long term viability of the state's information systems.

Information system plans and projects need to be coordinated with the state's information system architecture to insure compatibility and cooperative processing of the state's information. Development of policies and standards to insure up-to-date guidance for information system decisions will continue to be an important priority for the Department.

Standardization of microcomputer products through cost effective support, training and purchasing assistance will continue to be stressed as a critical direction for the Department of Administration. Hardware term contracts and software upgrade purchasing assistance offer important incentives for standardization. Considerable progress to standardize on Lotus 1-2-3 and WordPerfect has been achieved, however further improvements are needed.

The state's return on the investment in microcomputer and network technology can be maximized by creating and implementing new statewide office application systems. New statewide office systems with straightforward user interfaces can substantially increase in state employee productivity.

Office systems like the Budget Development and electronic mail systems have demonstrated areas where automation has improved decision-making and helped to control the cost of state government operation. Improvements are still required

and additional office systems need to be made available to more state offices. An office system support program needs to be structured to service the office support needs of state agencies.

The knowledge and skill level of state employees concerning computer and telecommunications equipment they use must be improved to insure the highest level of productivity gains possible. By offering a high quality classroom training program, the Department expects to deliver 1,500 class days of training for state personnel each year.

To improve productivity of personnel, new software tools for microcomputers, mainframes and computer networks will be analyzed and implemented. New technologies need to be analyzed each year to determine areas where technology can most benefit the state (for example, desktop publishing, or optical disk storage).

Policies and programs which expand state government's commitment to security and recoverability of information and systems are necessary so that government services are not disrupted due to advertent or inadvertent breaches to the security of state information systems.

The accessibility of state information by the general public needs to be improved by offering and promoting direct private computer access to state information. Billing mechanisms for public access services need to be instituted to insure appropriate cost recovery. Addition of new public access applications each year would clearly demonstrate the state's desire to make public information available.





## FACTS AND FIGURES

This section: 1) summarizes expenditures for information systems and communications in Montana state government; 2) analyzes the state's installation of personal computers; 3) lists for each agency the multiuser computers installed, the number of personal computers and the number of information systems personnel allocated; and 4) list installation of telephone systems in 1987-88.

## FACTS AND FIGURES

Expenditures for information systems and communications amounted to approximately \$22 million in 1988 which includes approximately \$5.8 million in communications. This indicates that there has been a \$666,000 decrease in I/S expenditures as compared to the previously reported 1986 expenditures of \$17.7 million. This decrease was primarily as a result of reduced hardware and software expenditures. Hardware and software expenditures for 1988 amounted to \$4.1 million as compared to \$6.3 million in 1986. This

decrease is indicative of the decreasing price trend in the computer industry and the fact that a substantial computing capacity was added to the central computer in 1986.

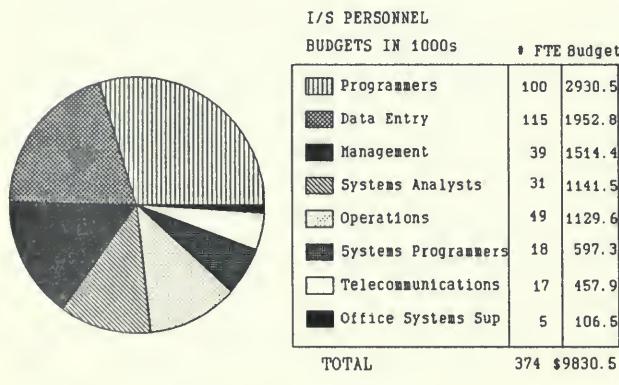


Figure 4 - 1988 I/S Personnel Budgets

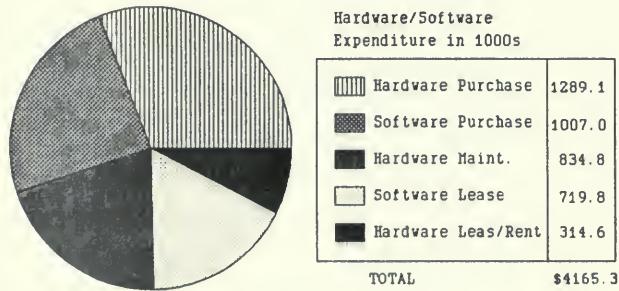


Figure 5 - 1988 Hardware and Software Expenditures

Figure 4 summarizes the state's 1988 budgets for information and communication personnel. Personnel budgets comprise 45% of the state expenditures for information systems and communications. This percentage is down from the 1986 figure of 51%. This reduction is due to the fact that with the addition of voice communication services and equipment, there has not been a corresponding increase in personnel. This is an indication of the productivity of the 17 people who manage and operate the state's telecommunication networks.

In 1988 I/S personnel (not counting communications personnel) comprise 57% of state's expenditures for information systems -- up from 51% in 1986.

In comparison to 1984 figures, there has been a decrease of over 100 people in the data entry professions. This indicates that more data is being captured at origination points via online applications.

Figure 5 summarizes 1988 expenditures for hardware and software which amounted to 25% of the state's investments in information systems. The comparable percentage for 1986 was 36%. In 1986, hardware purchase and rental amounted to 58.8% of the total investment in hardware and software; in 1988 this was reduced to 38%. Software correspondingly jumped from 19.4% in 1986 to 41.4% in 1988. Maintenance remained at approximately 20% of the total cost of hardware and software.

## FACTS AND FIGURES

Figure 6 represents the expenditures for communication services provided by the Telecommunications Bureau of the Department of Administration. These services are provided to all state agencies including the university systems. Expenditures for information systems in the University systems are not included in this report. Radio communications equipment and personnel managed by the Department of Highway are not included.

Long distance access comprises 33% of the total for communications service; 24% is allocated to communications equipment (including debt service); and 17% to local access service. Maintenance, data communications, add/move/change, contracted services and other (Telecommunications Bureau operational costs) make up the remaining 26%.

Figure 7 summarizes 1988 expenditures for information system services provided by private section vendors. This expenditure type has increased more than \$600,000, primarily in the computer processing and systems development area. Supplies increased only slightly.

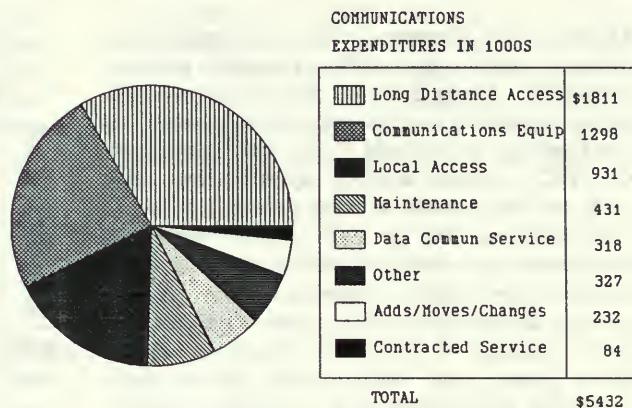


Figure 6 - 1988 Communications Expenditures

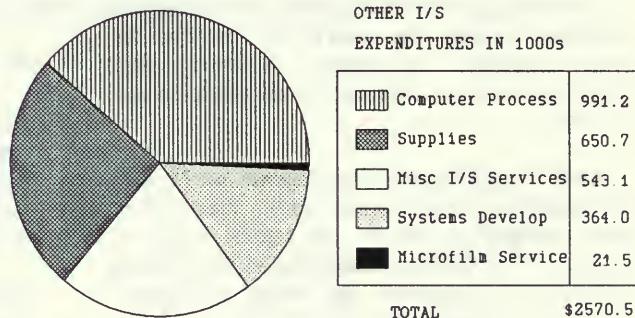


Figure 7 - Other 1988 Information System Expenditures

## FACTS AND FIGURES

Montana state government has experienced a significant growth in the number of installed personal computers. Figure 8 depicts the number of workstations installed as of January of each year. The 1988 edition of Personal Computer Report from COMTEC, a market analysis reporting firm, indicates that the national average growth in personal computers was 49% for 1986 and 44% for 1987. The report also indicates that, of the industries surveyed, government experienced the greatest increase in penetration (installation in new government agencies) of personal workstations. Montana's growth rate indicates state government's increasing dependency upon computing capabilities for management and provision of service.

Personal computers have replaced the once popular cathode ray tube (CRT) as the workstation of choice. The number of installed terminals remains at approximately 1300.

The majority of the personal computers have been procured through the state's term contract for microcomputers. This contract is usually rebid every two years to incorporate new products and vendors.

During 1988, Montana state government focused on networking workstations within local offices and establishing links to the central computer center. This approach has reduced the costs of software and improved the ability of support staffs to manage the increasing demand for personal computing resources.

Table 2 summarizes agency hardware and information systems personnel. Changes to the installations of multiuser computers have taken place in many of the agencies who manage departmental processors. Early microcomputer

Growth of Personal Computers  
in Montana State Government

Number of PCs

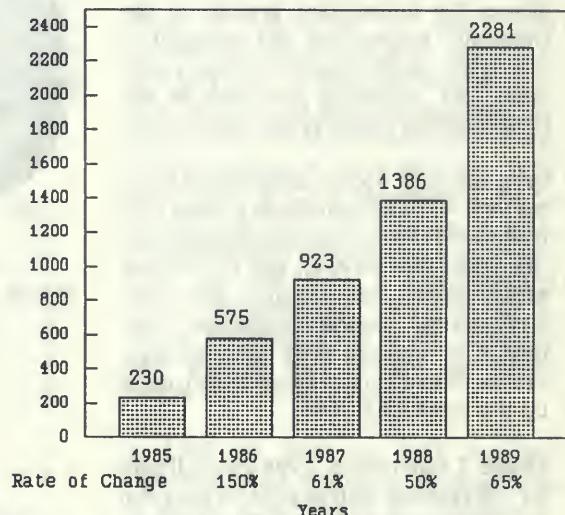


Figure 8

based multiuser systems have generally been replaced with networks of personal computers. Several agencies replaced outdated minicomputers with new hardware. One additional agency, the State Library, installed a multiuser computer.

The number of I/S personnel in Montana government has grown from 334 in fiscal year 1984 to 375 in fiscal year 1988. Even though there has been a growth in the number of personnel which support the state's information systems, this growth has not been able to meet the state's demand for I/S services. Agencies have increasingly turned to the private sector for contract programming, facilities management, training, and support services. Word processing operators have not been included in these figures, since they are considered as clerical support.

# FACTS AND FIGURES

The facts and figures presented do not include the University System. Much of the information is derived from the Department of Administration's Hardware Inventory System, the State Payroll Personnel and Position Control System and the Statewide Budgeting and Accounting System. The information from these systems will

generally err on the conservative side. There are undoubtedly workstations which have not been accounted for, and people who if reclassified would be considered information systems personnel. For instance, the Legislative Council I/S staff (approximately seven positions) is not included since the positions are not classified.

**Table I - Summary of Agency I/S Hardware and Personnel Assets**

AGENCY NAME	MULTIUSER COMPUTER(S)	PCs	#I/S FTEs
Administration	AT&T 3B2-400, IBM 3081 & 4381 WANG VS65	231	124
Agriculture		33	2
State Auditor	WANG VS65	2	2
Commerce	AT&T (2) 3B2-300, (2) 3B2-400, 3B2-600, DEC MicroVAX II	44	11
Family Services		74	2
Fish Wildlife and Parks		112	7
Governors Office		26	1
Health & Env. Science		148	9.5
Highways	DEC VAX 11/785, MicroVAX 2000	104	31.5
Historical Society		11	
Institutions	IBM S/38	105	6.3
Judiciary	IBM 5525	10	
Justice	IBM 8130, 5525	65	37
Labor	IBM (2) 8130, (4) 8140, (2) 8150, WANG (2) VS100	247	41.8
Lands		84	2
Legislative Branch		113	N/A
State Library	PRIME 2755	22	2
Livestock		25	1
Military Affairs		14	
Montana Arts Co		3	
Natural Resources	DEC (2) MicroVAX 2000	66	8
Public Instruction	Honeywell 6-47	37	7.5
Public Service Cmsn	IBM S/36	15	1
Revenue	IBM A/S 400	535	47.4
Secretary of State	WANG VS56S50	13	5.5
Social and Rehab Serv	WANG VS56S50	134	24.5
Other agencies		8	
	<b>TOTAL</b>	<b>2281</b>	<b>374</b>

## FACTS AND FIGURES

Table II lists the new telephone equipment which was installed in various locations throughout the state by the Telecommunications Bureau. These systems replace leased equipment with state owned equipment.

Table II - Telephone Systems Installed 1987 - 1988

LOCATION	AGENCY	EQUIPMENT TYPE
Anaconda	Job Service	Starplus 616
Bozeman	Fish, Wildlife & Parks	MSU SL 1 PBX
Butte	Highway Patrol	Starplus 616
	Investigations Division	Panasonic 2-line
	Mt College of Mineral	
	Science and Technology	
	Job Service	SL 1 MS
	Social & Rehab Services	Eagle One
	Job Service	SL 1 MS
Cut Bank		Merlin 206
Deer Lodge	Montana Promotion/Prison	ECD 1000
Glendive	Highway Patrol	Delta 824
Great Falls	Fish Wildlife & Parks	Comdial 1432
	Fire Training Services	Comdial 616
	Job Service	Starplus 616
	SRS/ Family Services	TelPlus 1648
Havre	Highway Department	Comdial 824
	Job Service	Delta 824
	Agricultural Rsch Center	Toshiba Strata
	Probation and Parole	Panasonic 2line
Helena	Fort Harrison	SL 1 RPE
	Lewis & Clark Appraisers	
	and Assessors Office	Comdial 824
	Lottery	SL 1 RPE
	Montana Arts Council	Comdial 824
	Science & Tech Alliance	Encore CX
	SRS/ Disability Deter	SL 1 RPE
	Workers Comp Court	Encore CX
Kalispell	Job Service	SL 1 M
Lewistown	DNRC Water Rights	Intertel 612
	Job Service	Delta 824
Livingston	Park County Human Serv	ITT 1A2
Olney	Stillwater State Forest	Comdial 616
Polson	Probation & Parole	Comdial 308
Yellow Bay	UM Biological Station	Comdial 616
	Job Service	Delta 824



# APPENDIX

## MONTANA DATA PROCESSING ADVISORY COUNCIL

### Chairperson

Ellen Feaver, Director  
Department of Administration

Andrea Bennett  
State Auditor

Curt Chisholm, Deputy Director  
Department of Institutions

Keith Colbo, Director  
Department of Commerce

Paul Dunham, Director of Research and Services  
Commissioner of Higher Education

Jack Ellery, Deputy Director  
Department of Revenue

Larry Fasbender, Director  
Department of Natural Resources

James W. Flynn, Director  
Department of Fish, Wildlife and Parks

David Good, Chief Deputy  
Secretary of State

Gail Gray, Director  
Department of Social and Rehabilitation Services

Susan Hansen  
Administrative Officer  
Department of Justice

Peg Hartman, Acting Director  
Department of Labor and Industry

Dennis Hemmer, Director  
Department of State Lands

David L. Hunter, Director  
Office of Budget and Program Planning

Bill Opitz, Deputy Director  
Department of Health

Robert Person, Director  
Legislative Council

Gene Huntington, Director  
Department of Family Services

Debbie Schlesinger  
Acting State Librarian  
Montana State Library

Scott Seacat  
Legislative Auditor

John Skufca, Administrator  
Centralized Services Division  
Department of Livestock

Gary Wicks, Director  
Department of Highways

## APPENDIX

### TELECOMMUNICATIONS POLICY ADVISORY COUNCIL

Chairperson Rep. Joe Quilici Butte, MT	Daniel Dolan Office of Public Instruction	Senator Richard Manning Great Falls, MT
Ardith Aiken Great Falls, MT	General James Duffy Military Affairs	Debbie Schlesinger State Library
Robert Albrecht University System	Senator Delwyn Gage Cutbank, MT	Lyle Stortz Roundup, MT
Gordon Browder Missoula, MT	Rep. Earl Lory Missoula, MT	Gary Wicks Department Of Highways

### MONTANA FREQUENCY ADVISORY COMMITTEE

Ron Haraseth, Supervisor Communications Section Department of Highways	Doug Williams, Undersheriff Chouteau County Sheriff's Office
Homer Young, Communications Technician Disaster & Emergency Services Department of Military Affairs	Robert Schieder, Communications Officer County of Missoula
Robert DeLange Forestry Division Department of State Lands	Jesse Gonzalez, Communications Supervisor Billings Fire Department

# APPENDIX

## PUBLIC SAFETY COMMUNICATIONS TASK FORCE

Telecommunications Policy Advisory Council (TPAC)	Lyle Stortz, Chairman Roundup, MT
League of Cities and Towns	Ardith Aiken, Mayor City of Great Falls
Fire Marshal	Ray Blehm, Chief Fire Marshal Bureau Department of Justice
Associated Public-Safety Communications Officers (APCO)	Michael Bloom Asst. Chief of Police Helena Police Department
Board of Crime Control	Gordon Browder, Ph.D. Missoula, MT
Emergency Medical Services	Drew Dawson, Chief Emergency Medical Services Bureau Department of Health
State Lands	Bob DeLange, Communications Officer Forestry Division Department of State Lands
State Senator	Senator Delwyn Gage Cutbank, MT
Department of Livestock	Les Graham, Executive Secretary Board of Livestock
Department of Highways	Don Gruel, Administrator Maintenance & Equipment Div. Department Of Highways

## APPENDIX

### PUBLIC SAFETY COMMUNICATIONS TASK FORCE

Montana Frequency Advisory Committee (MFAC)	Ron Haraseth, Supervisor Communications Section Department of Highways
Department of Fish, Wildlife and Parks	Erwin Kent, Administrator Law Enforcement Division Department of Fish, Wildlife & Parks
Montana Sheriffs and Peace Officers Assoc. (MSPOA)	Dan Magone, Sheriff Missoula County Courthouse
State Senator	Senator Richard Manning Great Falls, MT
Montana Association of Counties (MACO)	Gordon Morris Executive Director Montana Assoc. of Counties
State Representative	Representative Bob Pavlovich Butte, MT
Department of Justice	Captain Jerry Wilkerson, Chief Personnel and Training Bureau Highway Patrol Division Department of Justice
Montana Chiefs of Police Association (MCOP)	William Ware, Chief Helena Police Department
Montana Sheriffs and Peace Officers Assoc. (MSPOA)	Doug Williams, Under-Sheriff Chouteau County
Department of Military Affairs Disaster and Emergency Services	Homer Young Communications Officer Dept. of Military Affairs

## APPENDIX

### DATA PROCESSING MANAGEMENT GROUP

Administration	Mike Trevor
Commerce	Gary Wulf
Fish Wildlife and Parks	Jim Herman
Governors Office	Terry Johnson
Health & Environmental Science	Chuck Stohl
Highways	Don Lovely
Institutions	John Thomas
Justice	John Mathews
Labor and Industry	Roy Hickman
State Lands	Wally Jankowski
Legislative Auditor	Mary Bryson
Legislative Council	Hank Trenk
Natural Resources and Conservation	George Cawfield
Public Instruction	Steve Colberg
Revenue	Brenda Haseman
Social and Rehabilitation Services	Ken Curtiss
Vo-Tech Education	Ted Plaggemeyer

# ACKNOWLEDGEMENTS

## Agency Accomplishments and Goals

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Auditor	Terry Lazure
Commerce	Gary Wulf
Family Services	Patricia Gaydos
Fish Wildlife and Parks	Jim Herman & Richard Clough
Governor's Office	Terry Johnson
Health & Environmental Science	Shirley Fink
Highways	Dennis Burke
Historical Society	David Girshick
Institutions	John Thomas
Justice	John Mathews
Labor and Industry	Roy Hickman
Lands	Wally Jankowski
Legislative Auditor	Mary Bryson
Legislative Council	Hank Trenk
State Library	Debbie Schlesinger
Livestock	Dan Sidor
Military Affairs	Ken Cottrill
Montana Arts Council	Kathleen Burt
Natural Resources	George Cawfield
Office of Public Instruction	Steve Colberg & Ronald Lukenbill
Public Service Commission	Madeline Cottrill
Revenue	Brenda Haseman
Secretary of State	David Good
Social and Rehabilitation Serv	John Donwen
Judiciary	Jim Oppedahl

## Information Systems Architecture and Information Services Division

### Management:

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Jeff Brandt	Systems Development Bureau Chief
Tony Herbert	Telecommunications Bureau Chief
Dave Marshall	Information Center Bureau Chief
Paul Rylander	Central Computer Operations Bureau Chief

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200 copies of this public document were published  
at an estimated cost of \$3.38 per copy, for a total  
cost of \$675.00, which includes \$675.00 for printing  
and \$0.00 for distribution.